The Builder.

VOL. LXXXV.—No. 3178. DECEMBER 12, 1903

ILLUSTRATIONS.

Church of St. Peter, Lowestoft ..... Mr. E. P. Warren, Architect.
"Buckland," Brecknockshire ..... The late Mr. S. W. Williams, Architect.
Electric Generating Station and Offices, Ipswich ..... Messrs. C. Stanley Peach and C. H. Reilly, Joint Architects.

Blocks in Text.

A Postcard from Venice ..... Page 616
Sugar's Patent Tenoning Apparatus ..... Page 615

CONTENTS.

Stockport Town Hall Competition 605
Notes 607
The Applied Art Exhibition at Chelmsford 608
The Architectural Association 609
English and American Methods in the Erection of Buildings 609
Magazines and Reviews 609
Association of Municipal and County Engineers 609
The London County Council 607
Illustrations :—
Church of St. Peter, Lowestoft 608
"Buckland," Brecknockshire 608
Electric Generating Station, Ipswich 608
The Surveyors' Institution 609
Books Received 610
From Venice 610
Architectural Societies 610
Applications under the 1894 Building Act 611
Royal Commission on London Traffic 611
Correspondence :—
Brighton and Hove Hospital for Women Competition 611
The Montague Fordham Gallery 612
The Student's Column 612
Obituary 613
General Building News 613
Sanitary and Engineering News 614
Miscellaneous 614
Legal :—
A Hastings Nuisance and Light and Air Case 615
Architects' Fees 616
An Unauthorised Street 616
John Howard Colls, Appellant, *v.* Home and Colonial Stores, Ltd., Respondents 616
Patents of the Week 617
Meetings 617
Some Recent Sales of Property 618
Prices Current of Materials 618

Stockport Town Hall Competition.

STOCKPORT, like the majority of Northern manufacturing towns, has grown considerably in recent years, and, in process of expansion, has taken several smaller townships into its administrative authority. The proximity to Manchester and Liverpool, moreover, tends to increase its importance, and, being well served with railway, canal, and river communication, it is but natural that the city should anticipate continued prosperity. As it has, however, been developed from a series of detached communities, there is consequently no order in the lay-out of the thoroughfares; indeed, Stockport is as irregular and inconvenient as a large town could well be. Streets are hilly, narrow, occasionally passing under one another; there are no long stretches of roadway, and but few buildings possessing any merit.

Amongst other suggested improvements, the question of a new Town Hall has been before the Borough Council for some eleven years, but it was not until about six months ago that, a site having been secured, architects were invited to apply for selection to compete in designs for the new municipal buildings. From a large number of applicants thirteen competitors were chosen, but only nine sets of drawings were received. In our last issue we announced briefly the names of the authors of the premiated designs; we have since had the opportunity of inspecting the drawings.

The site is upon high ground, and, although containing a chapel, to be acquired at a later date, was considered as clear of all buildings, so that, having streets on four sides, some of which are eventually to be widened, the problem was simplified, and lent itself to a broad and dignified treatment. The form of the site is irregular, having only one side street (Eliza-street) square with the main front (Wellington-road South), which has an aspect of S.W. by W.; the remaining streets (Lacy and Edward streets) are both longer than those opposite to them, and no two streets are parallel; the ground rises considerably towards the rear, thus making the matter of levels in the buildings difficult. The accommodation required includes municipal offices and a town hall to seat two thousand people; the former included council chamber, committee-rooms, Mayor's parlour, offices for Town Clerk, Borough Surveyor, Borough Engineer, Treasurer, Collector, and Medical Officer, Gas, Electric Lighting, Water and Education Departments, etc. 60,000*l.* (inclusive of architect's fees) was the limit in cost, and this appears to us to have been one of the chief factors in influencing the assessor, Mr. T. E. Collcutt, in making his award.

The author of the drawings placed first is Mr. A. Brumwell Thomas, who has succeeded in producing, so far as external appearance is concerned, an excellent design, full of dignity, and withal honestly stone-like. The first impression gained from the plan is that this design is smaller in cubical contents than the other premiated schemes; the method by which this is principally obtained will be referred to later. A closer examination, however, reveals certain serious defects, and it is to be regretted that this admirable (in spite of the omission of scales and cardinal points) set of drawings should contain so great a number of the "tricks" which are often met with in competition designs; in this case the planning is so much affected by them that we feel compelled to draw attention to some of these inconsistencies. From the perspective view, which is most artistically treated, the roof of the town hall has been omitted, and one also searches in vain for chimneys, of which a very large number will be required; on the Eliza and Edward streets elevations the town hall gables and chimney from the heating plant are again left out; secondary staircases are planned in the side buildings to give access to offices and various other departments on several floors, and the plans show external doorways entering these staircases at basement and ground-floor levels; but the elevations give direct contradiction to such intention. There is no doubt that the main entrance-hall and staircase will have very little daylight, for although the plans indicate large staircase windows the section proves this to be a sheer impossibility, which is here admitted by the omission of the windows from the section; again, one of the two entrances to the council-chamber and the kitchen door opposite to it (through which access must be obtained during banquets in the committee-rooms) just escape three steps on the plan, but the section gives the correct relative levels, and the eight (nine, to be correct) steps there shown to ascend to the town hall floor-line instead of three, will quite prevent these two doors being constructed, and will necessitate a rearrangement of this important part of the design; the kitchen door should appear in the section, but is obliged to be left out. The report refers to the "public hall being at the same level as the Council suite," which is a statement at variance with both plan and section.

Coming to the actual planning, the town hall is placed on the east or highest part of the site at the rear, while the offices of the various departments are arranged on the three remaining sides. The committee-rooms (arranged *en suite* for banqueting purposes) and council-chamber are set in the centre of the quadrangle—a precaution against street noises. Most of the competitors have placed these committee-rooms on the street front. In this case, however, some considerable saving is effected in the length of the main façade; a reduction in the length of the side elevations is made by placing some of the offices below the end of the town hall, which does not appear to have been generally resorted to by other competitors.

A main corridor is carried through from the grand staircase past the council-chamber to the town hall, which is entered at a point half way down its length—an arrangement involving a procession of Mayor and councillors, upon civic occa-

sions, through the greater part of the audience. Two large internal areas are formed within the buildings, into which no provision is made for the access of carts, machines, etc., and here it should be noted that the Council will have a large business in gas stoves and other appliances. A remarkable point in this design, and, indeed, in the second and third schemes, is that large boilers are shown in the basement for heating purposes, but no external door is arranged to admit of the boilers being removed or new ones brought in if found necessary. In each case the Borough Council would be compelled to pull down some of the structure to accomplish this operation. The public hall is lamentably deficient in the matter of provision for rapid emptying in the event of panic; moreover, the placing of seating accommodation round the walls is surely to be deprecated; nor is the central passage in the seats (only 4 ft. 6 in. wide) to be recommended. The stage is much too small for the purposes in which it would here be utilised; the gallery staircases are small and insufficiently lighted, and discharge into the main entrance to the hall instead of more directly into a street; the lavatory accommodation, especially for men, when the hall is filled is inadequate, and no urinals are provided. There are a number of defects in the offices, such as the Mayor having to go downstairs to the council-chamber; the adjacent lavatories to be used by the councillors and, in this case, by the Mayor, have inconvenient steps leading down to them in order to admit of the public balcony of the council-chamber being placed over, to which there is a long, bewildering public approach from Edward-street. The Mayor's parlour has no robing-room, and no sanitary convenience is provided for his use. The lavatory arrangement throughout is very deficient and inconveniently placed; this is particularly so on one of the plans, where an important borough official has to pass through his own clerk's office to reach the small convenience provided. The corridors serving the offices are but 6 ft. wide, which is still further reduced where pilaster projections occur.

These, then, are some of the points which will be found wanting in the actual working of this scheme. There are others, perhaps, less important, and at the same time many good points are shown in the plans; but, generally speaking, it may be said that the planning has been unduly influenced by the design of the fronts. The elevations are without doubt the best in the whole series of drawings submitted, and upon these considerable thought has been expended. It should, however, be noted that the massing of the parts does not arise naturally from the planning, and the external window treatment is obtained at the expense of some internal convenience. The skyline is most satisfactory, an effect which is enhanced in these drawings by the absence of chimneys. In making this criticism of the design placed first we have deemed it necessary to draw attention to its deficiencies, which, in our judgment, would have been sufficient to give at least two other schemes precedence, for it will be generally conceded that it is inadvisable to accept a building which is attractive to look upon (in this case incorrectly represented) at the expense of its working convenience.

Turning to the drawings placed second, designed by Messrs. Willoughby and Langham, of Manchester, they are at once seen to present a much more practical working scheme, in which a great deal of attention has been devoted to the small as well as to the more important requirements; but, broadly speaking, the treatment of both plan and elevation is unduly cut up and disturbed. The arrangement is, in general respects, similar to the first premiated design, except that the public hall is entered at the north end, and many of the points to which we have taken exception in the first scheme are here missing. The town hall is well planned, good provision being made for rapid egress. The authors have arranged side galleries, as asked for in the conditions of the competition (wisely omitted in the other premiated designs); and as the end gallery overhangs a very large part of the auditorium we cannot anticipate a success in the matter of acoustics. The council-chamber is horseshoe in form, placed in the centre of the site, and has a kind of ambulatory, or members' passage, around it from which too many entrances are provided into the chamber. The council cloakroom and lavatories are placed centrally in a top-lighted apartment, but this, although convenient, is much too strained for good planning, and we much question whether it would be permitted from a sanitary inspector's point of view. One of the defects of this plan is the great distance to be traversed by the Mayor and councillors from their chamber to the stage of the Public Hall; but perhaps the greatest drawback to this otherwise good scheme is that the cash office, where rates are paid, is placed below the council-chamber, and can only be approached by passing the grand hall and staircase; the constant traffic in this part of the building would prove a perpetual inconvenience. Too much space is given up to the main entrance-hall and stairs, which, taken with the semi-circular porch, is larger than required and too magnificent. Moreover, secondary staircases, with lifts, are provided for reaching the offices on the various floors; in the provision of stairs and passages this plan is very wasteful. The elevations possess that modern rendering of eighteenth century work, with which we are now familiar. The central part of the main front is massed round the entrance, and has a dome which recalls Greenwich Hospital, whilst the extremities of the main front are projected slightly, with a heavier treatment, leading up to a cupola. None of these domical features serve any practical purpose, and even a clock is missing, which would have provided an excuse.

The design placed third is, in our opinion, the best-planned building in the competition, being practically free from all the faults to which we have drawn attention in the first and second premiated schemes; indeed, the author, Mr. H. T. Hare, here shows a grasp and mastery of the subject of a municipal building. Whereas the first two plans show complete schemes, the one under notice is based upon future extension at a time when the chapel will be removed. We cannot imagine that any extension will ever be required, unless it be decided to house other administrative departments on the site. This design, however, is capable of being easily converted into a finished scheme by bringing the offices, now setting back from Eliza-street on the north, forward to the frontage line; this would, moreover, remove the only objection we have to take to the plan, viz., that some of the offices would look into an area when the extension was finally built. In cubical contents, however, this scheme is somewhat larger than Nos. 1 and 2, and is cubed at prices which we should consider too small; but this is a contingency which can be overcome without affecting the design to any great extent, and would not have prevented us reversing the order of the assessor's selection. The council-chamber, horseshoe in shape, and provided with an ambulatory, is placed centrally, but the town hall is on the south, or right-hand side, of the site, the stage end of which is conveniently provided with access from the municipal building. The planning of the offices of the various departments is admirable; corridors and staircases are well-lighted, ample in size and not wasteful; all departments are made distinct and self-contained, and the entrances are separate, and do not involve the traversing of passages of other departments, which is more than can be said for the two schemes which receive the assessor's preference. Eighteenth century English Renaissance again supplies the theme for a design with a good feeling for stone treatment. A large clock tower is placed on the Edward-street front.

The design by Mr. C. R. Locke, of Southport, is placed fourth. This is quite a departure from the general run of the arrangement of the departments. The main entrance and staircase are placed at the corner of Wellington-road South and Edward-street, but serve no great purpose, for the stairs do not lead up to the council-chamber, which is again placed in the middle of the site, but is here too much mixed up with the offices. The town hall is intended to face Eliza-street on the north. The entrance is much too small, and quite inadequate for audiences of 2,000 persons. A great number of offices look into areas on three floors, amongst them the Town Clerk's private room and the deputy-Town Clerk's office! The elevations are very busy and the scheme generally too costly.

Messrs. Briggs and Wolstenholme are placed fifth, and their design is illustrated by a splendid set of drawings, but the planning is wanting in the elements of the subject. The council-chamber, the most important room in the scheme, is square in form, and placed next a noisy street, on the south side; one door only is provided, through which all ingress and egress is to be made; moreover, that door is placed at the end of a long corridor, exposing the Mayor and officials to some unpleasant draughts. Again, the main stairs and council lavatories are situated a long way off; the upper ground plan shows how the staff in the various offices would require to cross the landing at the head of the grand staircase to reach their conveniences. The main entrance is placed on the east front, and is marked by a large tower. The public hall is at the back, next Lacy-street, and here again a central lateral entrance is provided for the Mayor and councillors.

Mr. J. S. Gibson is disappointing. Although following the general placing of the departments by the other competitors, his plans show many inconvenient and unpractical detail's. The council-chamber could be much improved in its approaches,

and it is difficult to understand why so many offices look into areas where corridors might be more advantageously placed. The elevations are well designed, and show a praiseworthy restraint in treatment. The town hall main entrance has been set back and a carriage drive allowed for, but this has had the effect of making the south front a series of receding planes.

Messrs. Darbyshire and Smith locate their council-chamber over the main entrance, where most noises will be found; a dome is placed above it. The style employed is a kind of Renaissance very much overdone.

Messrs. Brady and Adshead have a good plan. Their whole design is kept very small in scale, and is wanting in vigour, the low elevations and small windows giving the impression of a building of much less importance. The town hall is on the north side, and has side galleries; the placing of the doors side by side to men's and women's cloakrooms and conveniences is bad. The Mayor is supposed to go up and down stairs to and from the council-chamber, and no robing-room and separate lavatory is provided for his use.

Messrs. W. Hill and Son, of Leeds, send a design with good fronts, but with a plan which does not call for any comment.

Looking broadly at the drawings submitted, this important competition has not produced a very high standard of excellence in design. It is true that four competitors failed to send in, but we could have wished for a better selection of competitors. The assessor's award leaves much to be desired, for, as before stated, we have very little hesitation in saying that after a careful comparison of the schemes we should have reversed the order of the three premiated designs. It is understood that the Council have not yet confirmed the award or made a final selection.

NOTES.

Municipal Loans. ANYTHING which Sir Michael Hicks Beach, as a former Chancellor of the Exchequer, has to say on financial questions is worth consideration. His advice, given to the Corporation of Cheltenham last week, that for a time municipal and local bodies should issue as few loans as possible, cannot be passed over. The value, says the late Chancellor of the Exchequer, of municipal securities has fallen because there are too many of them on the market; it is, in fact, glutted with high-class securities. When this is the case it follows, of course, that a smaller amount, and at higher interest, is subscribed when a local authority comes to borrow from the public. But, while this advice is certainly sound from a financial point of view, it seems to be given with a want of perception as to the needs of local authorities. A Corporation which has to create, for example, a new system of drainage must borrow the money for it. We believe that English local authorities are by no means rash in launching new undertakings, otherwise their financial credit would not be as good as Sir Michael Hicks Beach says it is. It would be a matter for regret if his advice caused local bodes to defer necessary sanitary and other public works. By all means let these be undertaken after due consideration; but a local authority is not a business syndicate to issue or defer the issue of stock according to the demands of the money market.

Secret Commissions and House Agents. HOUSE agents will do well to study the case of Andrews *v.* Ramsay and Co. in the Law Reports for the current month, since it was alleged the case decided a new point. The plaintiff was a builder who instructed the defendants, who were auctioneers and estate agents, to sell a property for him for 2,500*l.*, agreeing to pay them 50*l.* as commission. After sundry negotiations a sale was effected at 2,100*l.*, and out of the deposit paid by the purchaser to the defendants, the defendants, with the consent of the plaintiff, retained 50*l.*, the amount of their commission. It subsequently came to the plaintiff's knowledge that the defendants had also received 20*l.* as commission from the purchaser, and he brought an action against the defendants to recover this 20*l.* commission, and the money was paid into court. The plaintiff then sued the defendants for the 50*l.* they had received as commission from him, on the grounds that as the agents had created an interest for themselves in the sale they were disentitled to any commission from the plaintiff. The court gave judgment for the plaintiff, and hence the defendants received nothing at all in respect of the transaction, although the plaintiff had had the benefit of their services. So stated, the case may appear a hard one, but the reasoning is entirely satisfactory. The purchaser was evidently willing to give more for the property than the price agreed upon by the agent, since he paid the agent 20*l.* for commission; a secret profit which the vendor was entitled to as part of the purchase money.

Testing Electric Generators. THE paper on the testing of electric generators by air calorimetry, which was read to the Institution of Electrical Engineers last week by Professor Threlfall, is a very important contribution to practical electrical engineering. Methods of air calorimetry are well known in physical laboratories, but hitherto they have not been used in engineering work. The method was invented by Professor Threlfall in order to measure the efficiency of a 400 h.-p. electric generator which practically formed part of the engine to which it was coupled, and could not therefore be tested by the ordinary brake methods. He enclosed the generator in a roughly-made wooden case and supplied air to it by means of fans. The air first passed through a pipe to the case, and its velocity in the pipe was most accurately measured by a simple form of anemometer which the lecturer proved to be a trustworthy instrument. The temperature of the air entering and leaving the case was measured by ordinary thermometers. Now practically all the electric energy wasted in the generator goes to heat the air passing through the case, and since the specific heat of air is known, we can measure by this method the losses in the generator itself. The electrical output of the machine is measured easily by an ammeter and voltmeter, and thus the efficiency of the generator can be calculated to a high degree of accuracy, as an error of one per cent. in measuring the losses will only introduce an error of one-tenth of one per cent. in the value of the efficiency deduced. In the discussion, Dr. Glazebrook mentioned that experiments were being carried on at the National Physical Laboratory on the method used by Professor Threlfall to measure currents of air and that the results obtained practically confirmed the method. We consider this method of testing generators well worthy of the attention of manufacturers, and we see no reason why it should not be considered as a standard method of testing generators.

Fenders on Electric Cars. A DIFFICULTY not yet surmounted by tramway engineers and car builders is the design of a really satisfactory fender, or "cow-catcher." The cars of the London County Council tramways are provided with a fixed guard, which is evidently intended to scoop up any foot passenger who may fall in the way of a car. As the lip of this contrivance is several inches above the roadway, it is not at all certain that the expected result will be obtained, except, perhaps, in the case of a rotund person of large diameter and clothed in closely-fitting attire. There is danger that a child might be jammed between the lip and the roadway, and that the clothing of a woman would be caught in a similar manner. The only mishap of which we have heard on the County Council lines was the case of a young woman who was knocked down by an electric car and scraped along the road for fifty or more yards before the driver could pull up. This was clearly a case of clothing being caught. An inquest held a week or two ago at Teddington, regarding the death of a boy by one of the electric cars of the London United Tramway Company, makes evident the fact that the most approved life-guards are not worthy of their name. In this case an automatic cow-catcher was available, an appliance that could be controlled by hand, but it would also work automatically. From the evidence given before the Coroner, it appears that although the space between the guard and the track was only supposed to be five inches, the child was found fixed in the mechanism between the front wheel and the "cow-catcher." The body was so jammed that it was found necessary to remove the bottom boards of the car before it could be extricated. This result scarcely justifies the claim of the apparatus to be called a life-guard, and if, as stated by the engineer to the tramway company, this is the best appliance of the kind in Europe, enquiry should be made for something better in other parts of the world.

Memorial House to Melanchthon. IN Germany a great man's "Geburtshaus," or "Wohnhaus," is commonly regarded as well-nigh sacred, even if it possesses in itself no particular architectural interest or value. A strong appeal was made not long ago to the Grand Ducal Government of Saxony against the projected conversion of the Luther house at Eisenach into a restaurant. At Bretten, in Baden, a notable atonement, so to say, has recently been made to the memory

of Luther's contemporary and fellow-reformer. By the care and labours of Professor Nikolaus Müller, of Berlin, a memorial house has been built on the site of that in which Philip Melanchthon was born on February 14, 1497. The French destroyed the original house in 1689; six years ago its successor was pulled down. A ceiling in the new house is a copy of that of Melanchthon's study at Wittemberg; the rooms are equipped with portraits, MSS., coins, letters, and other exemplars relating to Melanchthon and his times, and the library contains first editions, mostly in duodecimo, of nearly all his works.

The Art Union of London.

WE have received a copy of the print issued this year, as usual, to its subscribers by the Art Union. It is a powerful and highly-finished etching by Mr. C. O. Murray from Mr. Stanhope Forbes's recent Academy picture, "Good-bye! Off to Skibbereen." This is one of those popular subjects of real life which are, we suppose, the kind of work most welcome to the majority of the subscribers; but, as in many other cases, the reproduction is unnecessarily large for the subject, and seems designed to satisfy the class who want a good large engraving on their walls of some subject they can understand, rather than anything representing the higher intellectual quality of art. At the time this annual Art Union bonus to subscribers was started, this was perhaps all one could get people to care for; but things ought to have got beyond that now. We should like to see the Art Union taking more pains to educate the people to the idea that quality is more important than quantity in black-and-white work, and that it is not the main purpose of the art of painting to depict realities of everyday life.

The Goupil Gallery.

THE exhibition now open at the Goupil Gallery contains in the first room a small collection of exceptional interest—studies and sketches by modern French painters, living and dead. It is seldom we get these in England. We find Daubigny, the landscape painter, represented by two sketches of interiors; and M. Jacque, another landscape painter, by studies of figures. By Diaz, on the other hand, there is a very slight pencil sketch of a forest scene which is Diaz all over—you can see in it the germ of his finished pictures at a glance. A very fine pencil study by Corot, "The Road to the Village," is probably an early work; one or two smaller ones indicate his later style. Among the other things in this room Mr. Haité's "The Cornfield" is a very fine study, and we are inclined to think he shows better in black and white than in colour. There are other fine studies by Troyon and by M. Fantin-Latour. The second room contains a selection of water-colours and pastels of unequal interest. Among the best are Mr. Robert Fowler's "Liseuse," a figure study somewhat in the manner of M. Fantin-Latour; Mr. Leslie Thomson's fine competition called "On the Blackwater," where a stranded ship rises up in the centre of the scene; Mr. Tom Brown's "Forsaken" (which should rather be called "Marooned"); and a little study called "Moonrise" by Mr. Roger Fry. There is a collection of Mr. Brabazon's colour-blottings, of which Nos. 102 and 116 are really too bad; there is a feeling for colour in others; but drawing comes first in all sound art. In the third room is a large collection of sketches by Whistler, some of them interesting, others worth little; it is a sample of the kind of absurd Whistler-worship of the day that such a thing as that called "nude study (*sanguine*)"—a minute red-ink scrawl in bad drawing, should be thought worth placing in an exhibition; it would be kinder to the painter to have kept it out of sight.

The Fine Art Society.

AT the Fine Art Society's Gallery is a collection of landscapes in water-colour by Mr. Sutton Palmer, exhibited under the general title "North and South." Here, at all events, there is no pretension of substituting scrawls and blots for finished art; these are landscapes showing most conscientious study of detail, while pervaded no less by a feeling for the beauty and the poetry of nature. "A Surrey Woodland, Spring-time" (12) is redolent of spring. Among the best of the others are "A Surrey Wilderness" (29), and "Near Newbury" (38); these are among the smaller drawings, but they are remarkable for their fine broad style. Among the highly-finished pictures "A Woodland Pool, Surrey" (52), if a little wanting in breadth, is quite perfect in truth and delicacy of representation; even the cattle, on a very small scale and not important objects in the picture, are conscientiously studied. The whole collection is a very satisfying one.

Holland Fine Art Gallery.

AT the Holland Fine Art Gallery in Grafton-street there is a small collection of pictures chiefly of the modern Dutch school on view. There are some very good names—Mauve, W. Maris, and J. Maris, but not represented quite at their best; W. Maris's "Ducks" has hardly enough subject for the size of the picture. Among the best are some works by M. de Bock, especially the landscape numbered 40—"The Marshes," a fine and artistic composition. A landscape by Gabriel, "The Farm" (22) has much beauty. Among the architectural interiors by Bosboom, which always seem made after one pattern, a small "Church Interior" (5) is very successful, and leads to the conclusion that his peculiar manner of treating interiors is really more suited to a small than a large scale.

New Buildings in Aldwych.

WE are glad to learn that Messrs. A. Marshall Mackenzie and Son, of Aberdeen, are to be the architects for a large and important building, a new hotel, in the new street Aldwych; not by any means that we wish the architecture of this new street to go out of the hands of London architects, or that we think there was any necessity to go to Aberdeen for it; but we are glad to hear that an architect who is an artist has been selected, whether Scottish or English. It is to be hoped the architecture of Aldwych will now show something better than the unfortunate commencement which has been made at the east end of the street.

THE APPLIED ART EXHIBITION AT CHELMSFORD.

THE prospectus which we received a month or two back of the Applied Art Exhibition which it was proposed to hold in the Shire Hall at Chelmsford from December 1 to December 5, conveyed the impression that this was a kind of popular bazaar rather than an enterprise in the cause of Art. The announcement of a cinematograph, a band, and excursions in a motor-car, were calculated to convey this impression, which, however, a visit to the exhibition has entirely altered. In the preface to the catalogue we observed that a kind of apology was made for these lighter entertainments, on the ground that the management wished to attract all sections of the community, and that there might be people, "even in the enlightened County of Essex," who required a little amusement with their art. In reality the exhibition deserved great praise, and was a genuine attempt to arouse a little interest in applied art in the neighbourhood, and give illustrations of its meaning.

The first room, the "Ball Room," did not fully illustrate the objects of the exhibition, and showed rather a miscellaneous assortment of what might be called trade exhibits, some of them not very remarkable; but there was a good collection of lace by Messrs. Wilson of London; illustrated books on ornamental design lent by Mr. Batsford (we did not see these, but they are in the catalogue), decorated leather work by Miss Ellen Sparks (Chelsea), and two pianos by Messrs. Brinsmead, with well-designed and not commonplace cases. In the centre of this room, however, was a remarkable exhibit—a beautifully executed ½ in. scale model of the Westminster Cathedral, lent by the Cathedral authorities, and which has not before been publicly exhibited. This was really worth coming to see.

In the "Jury-room," on another floor, we found a good exhibit of the Essex Art Pottery, a local product, though the clay used in it comes from Devonshire. There was a great deal of good work in this, with the additional and very useful attraction of the actual manipulation of the clay on a wheel, which seemed to excite great interest. Messrs. J. Osmond and Son (London) showed a collection of decorative wood-carving, including some very good and artistic work.

The real point of the exhibition, however, became manifest in the third room, called the "Picture Room." Round this were a series of tables at which a number of young ladies, all dressed in a pretty and effective kind of uniform, were seated, engaged in the fabrication of various classes of art workmanship. All these ladies, we gather from the catalogue, are students of the local Art School. One of the objects of the exhibition is stated to have been "to show what excellent results have been produced under most disadvantageous circumstances by the students of the Chelmsford Art Classes, and to raise funds towards the fitting and equipment of the new Chelmsford art buildings." A visit to this room was enough to convince any one that the Chelmsford Art School is a success and is doing excellent work; and the actual processes of book-binding, tile and china painting, repoussé work, gesso work, intarsia, etc., form an exceedingly useful exhibition to bring before general visitors, who would thus get (many of them, probably, for the first time) an idea of the way in which these applied arts are really produced. Among the work done and partially finished at the exhibition were some book-bindings which would have done credit to any art and crafts exhibition.

In a small room between the two last-named, for the entry to which a small fee was charged (probably with the view of avoiding a crowd of visitors who would have rather impeded the demonstration) the "new three-colour" process of photographing in colour was illustrated and explained.

We had great pleasure in visiting the exhibition, and hope that it will have the effect desired, of stimulating interest in applied art in the neighbourhood, and assisting towards providing a new building for the Art School. Great credit is due to Mr. F. A. Fawkes, the Hon. Secretary and organiser of the exhibition, for a spirited and well-meant effort to assist and promote local art study and art-production in this manner.

THE ARCHITECTURAL ASSOCIATION.

THE usual fortnightly meeting of the Architectural Association was held on Friday evening last week in the Meeting room of the Royal Institute of British Architects, No. 9, Conduit-street, W., Mr. H. T. Hare, President, in the chair.

The minutes of last meeting having been read and confirmed, and some nominations having been read, the following gentlemen were elected members of the Association: Messrs. C. J. Stewart, B. H. Collcutt, and P. G. Crawley.

New Premises Fund.

The President then announced the following further list of donations to the New Premises Fund:—Messrs. C. F. Selby, 5*l.* 5s.; H. W. Lonsdale, 5*l.* 5s.; W. C. Butterworth, 3*l.* 3s.; Geoffry Lucas, 2*l.* 2s.; "L. F.," 2*l.* 2s.; J. W. Wyles, 2*l.* 2s.; H. W. Braddock, 1*l.* 1s; J. B. Gridley, 1*l.* 1s.; A. S. Hewitt, 1*l.* 1s; H. A. Legge, 1*l.* 1s.; and E. F. Cobbs, 10s. 6d.

On the motion of the President, a vote of thanks was passed to the donors.

Mr. Louis Ambler, Hon. Secretary, announced that a meeting of the Camera and Cycling Club would be held on December 9th, when a demonstration would be given by the Lumière N.A. Company, Limited, on "Colour Photography." He also announced that a Discussion Section meeting would be held on December 16th, when a paper would be read by Mr. A. O. Collard on "The Work of an Exhibition Architect."

A vote of thanks was then accorded to Mr. Maurice B. Adams for a donation of old prints of the Royal Architectural Museum (on exhibition that evening).

A vote of thanks was also passed to the donors of lantern slides as follows: 51 slides of Gothic work, presented by Mr. W. Wonnacott; 27 slides of Classic and Gothic works, presented by Mr. G. H. Lovegrove; 48 slides of Gothic and Renaissance works, presented by Mr. Alan Potter; 5 slides of Beauchamp Shopland, Essex, presented by Mr. J. G. Collings.

A vote of thanks for the following donation to the library was accorded to Mr. B. T. Batsford: "The Drainage of Town and Country Houses," by G. A. T. Middleton.

Photography for Architects.

The following paper by the Camera and Cycling Club on "Photography for Architects" was then read by Mr. Francis R. Taylor.

MR. PRESIDENT AND GENTLEMEN,

The Architectural Association Camera and Cycling Club fully appreciate the honour conferred in devoting this evening to the subject of "Photography for Architects." It must be stated at the outset that as the question of photography and sketching is to be considered at a joint meeting of the Architectural Association Discussion Section and the Architectural Association Camera and Cycling Club, no discussion on that is intended to-night.

The work of the club is in itself sufficient evidence to show that photography has a useful sphere of action in architectural work. There are, however, many in our midst who consider that photography is opposed to the best traditions of the study and practice of architecture. It is therefore the purpose of this paper to put before you facts which will prove that photography for architects possesses a value both in the study and practice of architecture which cannot be overlooked.

The subject will be dealt with under two main heads, viz.:—

The utility of photography in

1. The study of architecture.
2. The practice of architecture.

and the apparatus and appliances for architectural photography will then be briefly considered.

The Study of Architecture.

The usefulness of photography in the study of architecture will be considered with reference to its value in educational work, and also to its value as a record of old work. Photography in its application to the study of architecture is simply a means of delineation, and it is the finished photographic print or lantern slide which is the valuable aid to study.

Photography should not be considered as antagonistic to sketching. It has a utility in the education of the architect by producing an accurate delineation of old buildings unattainable by a sketch. It must not be forgotten that however valuable a sketch or measured drawing may be to the individual student who prepared it, there is the personal error to bear in mind when this method of delineation is applied for general study.

Photographs in conjunction with measured drawings undoubtedly form the best means for architectural study and research. It may be mentioned that in the Architectural Association Sketch Book there are examples of measured drawings together with a photograph of the work. This method of illustration might be employed with advantage to a much larger extent, not only in the Sketch Book, but in all architectural publications. Whenever any old building of interest is to be pulled down to make way for modern improvements or for other reasons, a set of measured drawings with a series of photographs form the best record of the old work. In record work research should be made as to how the building has fulfilled its purpose and how its environment affected its design. To obtain this knowledge the employment of photography is a valuable assistance.

The method adopted for the training of architects by a system of instruction in classes has its value considerably enhanced by using photography as one of the means of illustration. The use of the lantern slide in lecture work is a great step in advance of the ordinary lecture diagram. It is essential, in order to make the instruction imparted by lecture work of the greatest value, that the illustrations employed should receive concentrated attention whilst the various points are being explained. Diagrams specially prepared for lecture work are in the majority of cases of but little avail, and it is impossible for the lecturer to satisfactorily explain from them, even to an average-sized class or meeting, the various points dealt with, simply because they cannot be properly seen from every part of the room, and, besides, in most instances, are badly placed for the lecturer's use. Frequently the walls of the room are smothered with measured drawings, plates from the building papers, and similar illustrations, and an attempt is made to explain some points when only one or two present can see the illustration referred to. One does not object to illustrations of this kind on the walls if they are simply intended for those present at the meeting to see for themselves before or after the lecture, but to use them as lecture diagrams is really the height of absurdity.

But all these difficulties are obviated by employing photographic means. Lantern slides of the actual work, of measured drawings, of illustrations from books and other publications—in fact, of illustrations from every available source, can be thrown upon the screen, can easily be seen by every one, and enables the lecturer's explanation to be understood by all.

Lantern slides for architectural lectures should be made with a view to suitability of purpose. Photographs of buildings, both externally and internally, would be useful to illustrate the grouping and general effect, and then should follow photographs of towers and spires, of piers and arches, of caps and bases, of doors and windows, of vaulting, etc., to illustrate the treatment of the parts, and, lastly, of mouldings and ornament. If a systematic sequence is followed, the slides would be of immense value in promoting the study of architecture.

In illustrating constructive subjects, the same principles should be adhered to—explanatory lantern slides to illustrate the manufacture and uses of the various materials, and then slides showing the different methods of construction.

Measured drawings, sketches, book illustrations, and, in fact, every process of delineation can be brought within the scope of the optical lantern. The possibilities of the usefulness of lantern slides in educational work is practically unlimited.

The slides themselves should on no account represent more than is required. Simplicity should be our guide in these matters. All diagrams, book illustrations, etc., should be represented on the screen as large as possible. The attempt to crowd many illustrations in one slide should be condemned. A lantern slide for lecture purposes should not consist of a confused jumble of details with meaningless letters or figures. It is bad enough in a text-book, but infinitely worse in a lantern slide. The object of all study is to gain knowledge, and not to cause confusion.

The use of telephotography in the study of architecture is one which should receive our careful consideration. In many instances parts of a building well worth studying are inaccessible for measuring, and in those cases an ordinary photograph gives a general idea of the composition and a telephotograph the details.

The Practice of Architecture.

The utility of photography in the practice of architecture might receive far more attention than it does. In many instances the only use to which photography is put in architectural practice is in the reproduction of drawings by the ferrogallic process. In this process the reproduced drawings are either on a thin paper, or on a paper similar to Whatman's, and a black or brown line is obtained on a white ground. The advantage of the process is that the reproduced copies can be coloured similarly to an original drawing. A great saving of time is effected, because from one complete set of tracings any number of reproductions can be obtained. If the reproductions are to be kept for a considerable time, as in the case of copies for the Authorities, care must be taken in the selection of the paper owing to its tendency to fall to pieces after a time. For this reason the authorities will only accept photographic reproductions on linen. The makers of the paper might consider the best means of surmounting this difficulty. It may be mentioned here that some of the papers used shrink slightly in the process of obtaining the reproduction—this emphasises the necessity of fully dimensioning all drawings. The ferro-prussiate process with a white line on a blue ground is sometimes used, but as colouring is then out of the question, it is not so suitable for general architectural work. Its use is limited to drawings where colouring is not essential, as, for instance, in details of steel construction.

Besides this special application, the use of photography in architectural practice is generally limited to what may be termed the legal phase of our profession, although a wider application would be a distinct gain. No one will deny that photographs of buildings about to be pulled down are valuable records, and in ancient light, easement, party structure, and such-like cases would always be useful on one side or the other. If the building happens to be one of considerable architectural interest, then the value of the record cannot be overrated.

In modern work, photography could be used to increase our knowledge and experience in a way little thought of, and the wonder is that it has not been more generally applied for the purpose.

Photographs of a building at its various stages of erection, with the dates, and in some instances the time, noted thereon, would be a valuable record of the class of work, and, in addition, would be very serviceable in the valuation of certificates. Photographs of special works of construction in buildings of a distinctive type would be most useful for future reference when dealing with similar works.

Photographs of the finished building should in all cases be obtained, and a comparison made by showing the photograph side by side with the perspective drawing. With reference to comparisons, a collection of photographs of similar detail and ornament of old and modern work would prove of use both in the study and practice of architecture.

The practical use of photography in delineating the progress of a structure from time to time is employed by engineers with the best results, and there is no reason why we should not do likewise. In a few isolated cases it is done, but it rests with the profession at large to avail itself of the opportunities within its grasp. This legitimate use of photography in our every-day practice would assist in grappling with many difficulties with an ease at present unknown.

The utility of photography in the study and practice of architecture having been dealt with, it now remains to deal with the technical part of the subject. It is evident that in order to obtain the best results in the application of photography to the study of architecture the taking of the photographs should be performed by ourselves, otherwise the photographs or lantern slides will not express the subject in the best way.

It is impossible for a professional photographer to know exactly what is wanted unless he happens to have made a thorough study of architecture, and we know that in the majority of cases he has simply a mere smattering of our requirements. If his speciality is architectural photography, his knowledge of architecture may, in a general way, be said to be peculiar, and not, by any means, extensive. Consequently, if the work is to be done well, the

photographs and lantern slides should not be left in his hands for selection of subject. There may be exceptions, but the exceptions prove the rule. It might, of course, be urged that the professional photographer could do the work under our guidance, but it will be found that this method is expensive, and is, in reality, only applicable in those instances where selection of subject is not required to any great extent.

It is desired to make a thorough record of an old building. Here the best way to proceed is to make measured drawings of the building, and a complete series of photographs. Who is most capable of taking the photographs? Unquestionably, he who undertakes the recording of the old work. Again, in detail and ornament, who knows which is best to select for architectural purposes? Certainly not the professional photographer, for he would be in a state of bewilderment, whereas the architect would not have the slightest hesitation about the matter. In the many requirements of architectural practice where the question of architectural selection does not arise, the photographic work can with advantage be delegated to the professional photographer.

The architect who decides to use photography as an aid in his study and practice should understand certain technicalities of photography. The questions which present themselves are:—

What is the best camera for architectural work?

What lenses should be used? What photographic plates and papers should be employed?

Dealing with the questions in order:—Firstly, What is the best camera for architectural work? Before anything can be done, the size of the camera must be decided upon. The ordinary sizes are: 4¼ in. by 3¼ in. (quarter plate); 6½in. by 4¼ in. (half plate); 8½ in. by 6½ in. (whole plate); 10 in. by 8 in.; and 12 in. by 10 in. It is generally agreed that the larger sizes are the best for architectural work. But the larger the size the more expensive it will be. Besides this, the weight of the camera is a serious matter, especially as in the majority of cases the work would be done at a distance from home. For these reasons it may be conceded that the half plate is the most serviceable. When lantern slide work is contemplated, the quarter plate is generally selected, as that is the most suitable size for the purpose.

If a good lens is employed, the quarter plate size might be used for all work, as the photographs can be enlarged with satisfactory results.

The requirements for a good camera are:—

1. Lightness, with rigidity.
2. Rising and falling adjustment to the front of the camera.
3. A reversing and swing back.
4. A long extension.
5. Parallel bellows, or only slightly conical.
6. Focussing screen and focussing adjustment.
7. Double dark slides.

The lightness of a camera is necessary for convenience in carrying about, and rigidity is required to prevent movement whilst the photograph is being taken. The rising and falling adjustment allows the position of the photograph on the plate to be varied. In architectural work a considerable rise is frequently required. The reversing back is essential in order that the photograph can be taken in a horizontal or vertical position. In many cases the camera must be tilted to include the whole of the building, hence a swing back must be provided, for the plate must be kept vertical, otherwise the vertical lines of the building would converge in the photograph. A long extension provides for the use of a long focus and telephoto lenses.

Parallel bellows prevent the cutting off of the edges in the photograph when a short focus lens is used.

The focussing screen is the sheet of ground glass upon which the photograph is depicted. It is adjusted to obtain a clear, sharp image by means of a rack and pinion movement. The double dark slides hold the plates for exposure, and at least three, or, better, six, double dark slides should form part of the outfit. The question to decide in the selection of a tripod stand is one of rigidity, compactness, and portability.

Secondly: What lenses should be used? It is best to provide in an outfit for architectural work a set of lenses of different foci and of a good make. The lenses should be of a rectilinear type. For average work the rapid rectilinear of about 7 in. focus is most serviceable on a half plate. Long focus lenses are useful in detail work, and wide angle lenses are essential in confined positions.

The telephoto lens would be a most valuable acquisition in the equipment. Some of the best examples of detail work are at too great a distance from the position available to give a photograph of a satisfactory size, but a telephoto lens enables you to obtain it to a larger scale with the same extension of camera. As this lens is not of a fixed focal length, the scale of the photograph can be altered at will.

Thirdly: What photographic plates and papers should be employed? Ordinary plates of a good make are the best for architectural work, especially for interiors, although in dark interiors, where very long exposures are requisite, rapid plates may be used with advantage. Isochromatic plates are useful where the lighting of the interior is yellow. In interiors where the light from windows, etc., would be likely to cause halation it is necessary to use backed plates.

The development of the negatives requires care on the part of the operator. The developer which the majority of workers prefer for negatives is one of the pyro formulæ—either pyro-ammonia of pyro-soda—and there is no doubt that a very wide latitude is given by the use of pyro. Hydrokinone is a cleaner developer, and for that reason is the one generally selected for lantern slides—it has not the wide latitude of pyro, but in lantern slide work this is not so important. The method of procedure cannot be discussed now. It may be mentioned, however, that the architect-photographer should do his own development, and not follow the advice expressed in the well-known advertisement phrase of "You press the button, we do the rest."

The chief printing processes can be classified under four heads, viz.:—(1) Silver printing-out processes; (2) platinotype; (3) carbon; (4) bromide; and the decision as to what processes should be adopted depends upon circumstances.

A silver printing-out process such as the well-known P.O.P. of various makes, produces excellent results, but if permanent photographs are required, then platinotype or carbon processes should be used. For enlargements, bromide papers are most satisfactory. The advantages of the various processes can be best judged of by the numerous prints which will be placed before you for inspection.

The chief printing processes can be classified as follows:—

1. Printing-out processes.
2. Processes requiring development.

Printing-out processes include all the processes in which printing-out is resorted to. The albumen silver paper is an example, and at one time was the one generally employed. The gelatino-chloride of silver printing-out paper, commonly called P.O.P., has to a large extent superseded it. The P.O.P. of various makes, with suitable toning and fixing, produces very effective results.

The processes requiring development are best exemplified by platinotype, carbon, and bromide. If permanent photographs are required, then platinotype or carbon processes should be decided upon. For enlargements, bromide papers are most satisfactory. The advantages of the various processes can be best judged of by the numerous prints which will be placed before you.

The architect photographer, being fully equipped, now sets forth to take photographs. He makes a selection of some old building, and, if he be an earnest worker, he does not, as is often thought, make a tremendous rush at it. Whilst long exposures are being given he devotes his time to finding out all he can about the building, and maybe he measures details and obtains full sizes of the mouldings.

It seems to be a stock argument with the opposers of photography for architects to refer to the inverted image on the focussing screen, as if that were the important part of studying the work. That is only a means of obtaining a good photograph, and as to the inverted image, one gets used to it in precisely the same way as our minds have been able in infancy to correct the impression of the inverted image which is produced on the retina of the eye.

The great question before you is the utility of photography in our study and practice. The question of photography and sketching is not to be considered, and if you are fired to enthusiasm in this matter, there will be ample scope for your eloquence at the meeting on the 6th of next month previously referred to.

The value of combining photography with measured work should receive a large share of your attention, and encouragement is much needed for architectural research, and in giving it every method of delineation should be recognised, together with a clear description of the work and its history.

Mr. Arnold Mitchell, in proposing a vote of thanks to Mr. Taylor, said they must all recognise how much trouble Mr. Taylor had taken in the matter, not only in the preparation of the paper, but in the way he had collected and grouped around the walls so many photographs. He had been specially struck by one remark in the paper, *i.e.*, "The object of all study is knowledge," and it was to be supposed that discussion there, at the end of the papers read, had a similar object, and so any critical remarks must be taken in that spirit. There were many points in the paper one might refer to, but there were two he would touch upon specially. Mr. Taylor said at the outset that no discussion was intended that night on the subject of sketching *v.* photography, as the matter was shortly coming before the Discussion Section of the Camera and Cycling Club, but a little further on Mr. Taylor said, "Photography should not be considered antagonistic to sketching," and in several other places he discussed the matter. More than that, the lecturer had shown some interesting slides of the poor architect's sketches, and had compared them with photographs of the same buildings or features. In this connexion, it was impossible to separate sketching from photography. He would not say more on this head, except to add that he was a hopeless opponent of Mr. Taylor's views, for it seemed to him that sketching was absolutely essential to the student of architecture. Photography was anathema to the architectural student until he had mastered sketching. It was well enough for a man whose time is limited, and who wanted to get details of what he was sketching, but the moment a man took to the camera, his sketch-book was too often left behind. The facilities for getting a large number of pictures were so great with a camera that a man did not care to add to the bulk of the apparatus by taking his sketch-book, and so he did not spend much time before a building, and study those points worth knowing. The camera should be for older men; to the student it was anathema. The second point he wished to refer to was that if they did backslide it was most important to make a good job of it; "be a photographer as well as an architect," he would say. He had been struck in seeing some of the lantern slides by the fact that the architect came first and the photographer was a bad second. Surely the architect had an enormous advantage over the professional photographer in knowing what to take. Architects knew what they wanted, and they should not neglect the photographic part of the business entirely, as they did sometimes in the photographs they took. If architects must photograph, their photographs should be of the best. He had brought with him some half-dozen slides of architectural subjects taken by a young amateur friend of his. He should like to show them, and at the same time have put upon the screen again the series of professional architectural photographs that Mr. Taylor had compared with the slides taken from architects' sketches. [Mr. Mitchell then showed about half-a-dozen beautiful slides of buildings and details. He especially called attention to the clearness of focus, and the effect of light, and one, interior of Exeter Cathedral, he characterised as a beautiful bit of pictorial work—far more beautiful than the average photograph taken by architects.] The point of view of the amateur was every bit as good as that of the architectural student in this matter. Was it not worth while to aim high and try and get detail which would come out on the screen with the brilliancy and effect of some of the slides he had shown? His friend who took these views used a ¼ in. plate, and his method of printing was direct from the negatives, which was not the usual method of members of the Camera Club, he believed. His friend always used on his camera a little level screwed down on to it—not the ordinary screw level, but a circular one with a tiny hole in the centre with a little bubble coming exactly under this little opening. It was by care and attention in small matters that the best results were obtained.

Mr. G. Scamell, in seconding the vote of

thanks, said that he was afraid that if one went much in for reproducing picture work from books, etc., for lecture work, there might be difficulties about copyright. It was a great advantage in photographing buildings, especially monuments, to introduce a scale, so that in future reference one could always get a rough idea as to size. The Society of Antiquaries published a very good scale for 6d., which could be put on the base of a building when photographing. It did not interfere with the artistic view, and it was of great assistance afterwards to get a rough idea of size. As to the size of the camera, he always used a whole plate, for he found it a convenience. If one had a whole plate size camera, a piece of cardboard could be used and only half-plate need be used if that was desired, and the whole plate could be taken whenever they liked. The most useful levels were the plumb bob. For architectural work square bellows were far preferable. As to lenses, it was of great advantage in architectural work in having a lens inserted in a camera not to have it inserted in the middle of the front, it should be as high as possible. Mr. Taylor recommended carrying a series of lenses, but an ordinary stigmatic lens gave a choice of three foci. As to plates, for the last 600 or 700 negatives he had taken he had not used a plate. Instead, he had used nothing but Wellington and Ward's stripping films. The advantage of that was that in cycling with a camera the weight was kept down—it made a difference of 5lb. or 6lb., which was important. With films, one got practically no halation. As to printing, if a permanent result were desired, there was nothing for it but platinotype. Carbon did as well, but it was difficult to work. For mounting, the only thing to be used was starch paste. As to exposure, expose too long rather than too little.

Mr. Hugh Stannus, in supporting the vote of thanks, said he felt a little sympathy with Mr. Taylor while Mr. Mitchell was criticising, for the slides that Mr. Mitchell showed were so very beautiful that a new terror was added in lecturing. He could quite imagine some innocent lecturer, who in an unguarded moment had promised to read a paper on, say, Egyptian architecture, having thrust upon his audience, after he had done his best, some half-dozen slides of Egyptian work which would quite outshine his own. He supposed that the slides Mr. Mitchell had shown were taken by Mr. Gardner. [Mr. Mitchell: No.] Mr. Gardner belonged to the class of amateurs, but he was most artistic in the matter of lantern slides. He did not think that any of them could equal him; and the slides Mr. Mitchell had shown were so beautiful that he thought they were by Mr. Gardner. As to the use of photography, he remembered a very striking remark made by the late Lord Leighton arising out of the photographic snapshots by Mr. Muybridge, the American, of animals in motion. He (the speaker) asked Lord Leighton if he thought these would be of any use in his work, and the reply was that, though they might be of use to some people, he did not think of using them himself, as he preferred to go along as he had begun, using those powers with which Nature had endowed him, and nothing else. He (the speaker) thought that that was a pregnant remark; it meant so much more than Lord Leighton said. He very much admired some of the beautiful slides shown of views of roofs and ceilings looking up. He supposed those were taken with Reflectors. Such views could be taken with Reflectors at 45 deg., or with the camera pointed upwards. He had had a Reflector made to hook on to the front of his camera by the Autotype Co.; and by means of it he had been enabled to take a number of those beautiful incised tomb-slabs in the Camposanto at Pisa, which were very difficult to get in any other way. Ceilings as well as floors could be taken, and he advised all students to have a Reflector, for it was of great use. As to showing lantern-slides to students, there was an important point which had not been alluded to. In order to show slides darkness was needed, and that meant that students would be unable to take notes. He had been asked at South Kensington to use lantern-slides, and for the sake of the students he thought he ought to say no, but since then he had seen the expedient used at Liverpool by Professor Simpson, whom they were all glad to have back in London. The arrangement, which was admirable, admitted light from a side-window, and students were able to see to write, while the screen was hung against the dark part of the side-wall in the corner. Where slides were shown to students there ought to be arrangements for taking notes, and he hoped that some such arrangement would be made in the new premises of the Association. He did not agree with Mr. Taylor in regard to showing construction. Slides for buildings as a whole, and for details, were all very well, but when one came to beams and joists, etc., he thought that students learnt more from models than from slides. Another point, one which had not been dealt with, was the difficulty a lecturer had in illustrating comparisons—comparisons between two buildings or periods. That difficulty was obviated in some cases by two lanterns and two screens, but that was a serious expense. Another way was to have two slides together, showing first one and then the other several times. But he thought the two-screen method was the best one. He had not noticed a measure on any of the views which had been shown. A yellow measure did not take, but the black and white one which Mr. Scamell had shown was admirable, and at a cost of sixpence all photographers ought to have one. As to sketching, Mr. Taylor might have made another point. Just as the greater includes the less, so one might photograph a sketch, but one could not, in anything like the same time, sketch the photograph. Photography and making photographic slides need not by any means do away with sketching, and he trusted it never would, for if it did it would be a curse to the architectural student. Notwithstanding photography, one could always go on sketching, and sketches one was always glad to see. He had done some photography himself. When one was inside a church and had to wait, perhaps, forty minutes for a photograph to take, there was time to take full-size mouldings and dimensions, and every young photographer should do that. One of the reasons for sketching was that a man should spend a certain time in front of a building. Street told a student who was going to Italy that when he was in Verona he should sit in front of S. Anastasia for an hour and look at the building, for it was only in so doing that one realised the beautiful proportions. He (the speaker) had been in front of S. Anastasia with his camera, and after ten minutes, which enabled him to take a photograph, he had gone off to the Duomo. Now, he could not remember much about S. Anastasia; and that indicated one of the drawbacks of photography, as any one who had sketched the building would be able to appreciate and remember its beauty. As Mr. Mitchell said, the advantages of photography were in the case of a man who had gone beyond his early student days. Such a man could, with a camera, get 300 photographs in a three weeks' tour in Italy. A man could not go to Italy and in three weeks bring back 300 sketches. What was so valuable in photography was the quickness with which one could take records. He sympathised with Mr. Taylor in grappling with the whole subject. He (the speaker) thought that several members of the Camera Club would have taken different branches of the subject, and had that been done, there would have been several interesting expressions of personal views. Mr. Taylor deserved the best thanks of the meeting for his attempt to grapple with the whole subject.

Mr. J. D. Crace supported the vote of thanks. Mr. Taylor had pointed out a good many of the uses of photography, but he had not touched on the archæological side. That was certainly one of the most valuable phases of photographic work, for with a good clear photograph, taken in a proper light, points could be seen that might very well be passed by the eye affected by a large amount of general interest. Any point of interest could be concentrated in a photograph, and information was gained in this way that might not otherwise be got. Mr. Fergusson pointed that out to him in the case of the Erectheum—how certain joints could be observed and certain details, which indicated changes of intention which hours on the building would not have revealed. Mr. Spiers made the same observation in discussing the subject of Baalbec: a change in the method of building at a particular point was shown by the photograph, which was quite obvious on the spot, but which could very well be passed by unless attention were drawn to it. The success of a photograph depended to a great extent on the selection of suitable light. In the case of Mr. Mitchell's photographs, the artist evidently had an eye for the light treatment of his subject, particularly of interiors. That was of great importance, for in forced and strong contrasts of light a great deal of detail was lost as well as many charming gradations of shadow. As to the camera *v.* sketching, a student might easily be led to devote too much time to the camera and too little to the pencil; but to the more mature student, whose time was taken up with his professional work, photography was of great use. The camera, used fairly, was a help. But the student would do well to remember the truth, which was happily put by a clever man, who said that if he had to write a book on the general principles of education its title should be "Sur la nécessité de rendre l'étude difficile," and so it was with the man who was compelled to spend an hour before his subject; he knew more about it at the end of that time than the man who had spent only ten minutes.

Mr. W. Wonnacott, in supporting the vote of thanks, said that the work the Camera Club was endeavouring to do was for the benefit of the Association—the good old idea of mutual help and support. He agreed with Mr. Stannus that some interesting views would have been expressed had various members of the Camera Club dealt with different phases of the subject, and would have helped the lecturer to prove his case; it had been his idea from the commencement to arrange for such treatment of the subject. The subject had been treated under two broad heads: the study, and practice, of architecture, and the lecturer suggested that two more might have been added: the study and practice of photography; but the study of those subjects should go hand in hand. The paper contained no word on the literature of the subject, and it would have been well to have given a list of useful books. He was often asked what was a handy guide. He was often asked, too, what was the best camera. His reply always was: the very best you can afford, for it is no good starting "this black art" with toys. The chemical side of photography was not only interesting, but useful, and he had, as an architect, got benefit time after time in the knowledge he had gained in studying the chemical processes entailed in photography. Then, as to the actual photographic records, it was all very well to sit before a building and try to absorb it like a sponge, but they had heard that in ten minutes they could know nothing about a building, and yet, in ten minutes they could get a good photograph which would last a lifetime! He believed that in a very few years there would be marvellous results in colour-photography. Colour-photography was already a commercial process, but it was extremely expensive. In time the pretty sketch would go altogether, for science was coming to our aid in all departments of work, and it would be necessary in future only to train the student's eye to guide his hand. They were told not to touch photography until they ceased to be students, but he defied any one to tell him when he ceased to be a student. They must live and learn every day of their lives, and why they should give up a delightful pastime until middle life he could not see. As to telephotography, they could see how useful it would become. As to the Camera Club, it was more energetic than ever, and their little effort that evening was to show that the work they did was not time wasted. The Club was getting together a fine collection of lantern slides, which would be of permanent benefit to every one. There was one way in which the Association could help them—i.e., by starting a photographic competition, and by offering a small prize for some photographic work. If the photographers were doing work that was wrong, he suggested some such endeavour should be made in order to put them right.

The Chairman said that Mr. Mitchell had been rather severe on Mr. Taylor, but it must be remembered that Mr. Mitchell was a sketcher *par excellence*, and that consequently he took an extreme view. As usual, the right view to take, he thought, was the middle course. Photography should be regarded as an assistance in sketching, and not as a substitute, and he thought there was danger in a young student having a camera. The fact that the student, without any trouble, was able to take a number of pictures of what he saw must tend to prevent him making careful sketches or measured drawings. The very young student, therefore, ought not to take to the camera until he was well out of his pupilage. Per-

haps the best procedure was, as Mr. Taylor said, to make a measured drawing and then to take a photograph of the same work: that would make the best possible record. Mr. Taylor showed a view of the groining at the cathedral at Oxford, and said it would have been impossible to have made a sketch of it. Mr. Taylor could not have meant to go as far as that, for he (the speaker) had spent two long days sketching that groining, and he had no doubt that that work did him good; he was sure he would not have spent two days on the work had he had a camera with him. There was one disadvantage in the use of slides for teaching purposes, and that was in the fact that one view could be on the screen only for a few moments at a time if there were many views to show. If diagrams could be placed on the walls, and photographs of the same work shown on the screen, students could examine the work after the lecture. The practical uses of photography in such matters as questions of light and air were unquestionable, for nothing gave such a reliable record in points of this kind as photography. He had also found it very useful in surveying old buildings for alterations or additions, for it saved hours and hours of measuring. In the case of a brick wall, the height of inaccessible parts could be got with tolerable accuracy by counting the courses of brickwork in the photograph or by putting a scale against the building, as had been suggested. In putting the vote of thanks to Mr. Taylor he desired to include Mr. Wonnacott for having worked the lantern.

The vote of thanks was then heartily agreed to.

Mr. Taylor, in reply, said he thought the vote of thanks should be given to the Camera Club as a whole, because it was due to the Club that that meeting had been a success. He agreed that it might have been better to have had several members of the club deal with different branches of the subject, and that could easily have been arranged. As to Mr. Mitchell's criticisms, they must not forget that criticism should always be desired, nor must it be forgotten that Mr. Mitchell himself made use of photography in illustration of his very excellent lectures. Although Mr. Mitchell did not photograph himself, he knew that there were advantages in photography. As to the bad effect of photography on students, if the thing were going to be abused it should not be used. Photography was used by the earnest worker as a means to promoting his own study. Not only should a student photograph in order to aid him in his work, but he should measure and draw. It was an excellent plan to introduce a scale into a photograph, and the scale referred to by Mr. Scamell seemed to be a good one. As to the difficulty of getting light in a lecture-room for the purpose of enabling students to take notes, only half the lights need be turned out, and the light thus obtained was strong enough for the student's purpose. As to models being preferable to slides of construction, he thought that both should be used. As to the time slides were on a screen, that depended on the lecturer and on the subject. In a good many cases it was sufficient to have half-a-dozen slides to illustrate a lecture. Photography, if taken to, should be done well; it was no use taking half measures. Mr. Mitchell's slides were all specially selected, it must be remembered, but they were all obliged to Mr. Mitchell for bringing them to the meeting. As to the photograph of vaulting looking up, no reflectors were used, the camera was simply placed pointing upward.

The Chairman announced that the next meeting will be held on December 18, when Mr. G. P. Bankart will read a paper on "Old Stucco and Plaster Work, with Reference to Modern Possibilities."

The meeting then terminated.

MAIDENHEAD (ROAD) BRIDGE.—The Corporation of the Borough will apply for leave to bring in a Bill, next Session, for the purpose of freeing the bridge from the tolls originally levied in pursuance of the Act of 1772, of discharging the mortgage debt, and of vesting the property, as the "Bridges Estate" or "Undertaking," in the Corporation. The bridge, replacing the old wooden one which had been first built in the latter half of the thirteenth century, was built in 1772-4, at a cost of about 20,000*l.*, after plans and designs by Sir Robert Taylor. It consists of seven semi-circular stone arches, with three smaller arches of brick at each end.

ENGLISH AND AMERICAN METHODS IN THE ERECTION OF BUILDINGS.

LAST week we gave the first part of a paper entitled "A Comparison of English and American Methods in the Erection of Buildings," which was read by Mr. Charles Heathcote, of Manchester, before the Institute of Builders, in the Hall of the Society of Arts, John-street, Adelphi. We now give the conclusion of the paper, and some notes of the discussion which followed:—

"There has been much talk about the number of bricks that can be laid per day. At the Westinghouse Works, Manchester, where I was associated architect with Mr. Rodd, one of the first engineers of America, it has been said that on a part of the work 1,600 bricks were laid per man per day. It is quite correct. We have had this number laid in a two-brick wall at a very different kind of building to a big works, Parr's Bank, Manchester, to wit, with ordinary bond set by trowel in firm mortar made with Warmsworth Cliff lime. This was without paying extra wages either. But 1,600 bricks was not the average, and I know of no building where such has been the average. But you may learn something from the Westinghouse Works, although the conditions were not those of an ordinary building, let under one contract to one builder. No contractor was ever asked to undertake the whole contract. All heavy work was let per ton, per cube foot, per square yard. The excavating was let to one firm, the steel to another, the slating to another, and so on—all English firms. On one side of the site were brick kilns, and whilst the excavations were in progress some 4,000,000 bricks were made and stored, the site was levelled, and about eight miles of railway track laid down connecting all parts of the works together, and proceeding from a main track from the Ship Canal docks and the principal railway systems. Timber was stored adjoining the rails, the large machine shop foundations were in, the steel work well commenced—in fact, there was a quarter of a million pounds worth of work done or material delivered on the site before an American contractor came to employ bricklayers, carpenters, etc. He did not come as a contractor with a contract price for doing certain work, but was an official of the company. Therefore there is no comparison of this work with that of a general contract. But he got the work pushed on rapidly, and, by saving time, saved the company interest on their money, and, being empowered by an enlightened Board to employ as many men as could be utilised, he accomplished the speedy work. And please note that the architects had every drawing ready. There was no delay of five minutes for instructions. There was nothing to wait for, and extra wages were given to men, enabling the best to be picked out and retained on the job.

If you want brickwork executed very quickly, do it at a great rate, have heaps of material ready, and put on every man you can. Pick out and keep the best men—discharge the others, and to entice the best men to your work, and to spin out all they know, make it worth their while to stop by paying 10 per cent. more wages, give bonuses for work executed against time, and have plenty of superintendents and foremen. It may not be the best finished, for perhaps it is not necessary, but we are talking of speed and how to obtain it. A great feature in the speed of bricklaying is the kind of foreman employed. If he be a man of ability, understanding his work, and with sufficient will power to have the work carried out as it should be, and retaining only the competent workers, the work progresses properly. There can be no criterion of how many bricks should be laid in, say, backing up stonework, erecting buildings partly stone and partly brick, but in an ordinary building, faced with stocks, with stone dressings, general internal walls with the usual doorways, arches, fireplaces, flues, beam filling, and such like, if a bricklayer averages throughout 700 English bricks of common brickwork per day of ten hours, he is doing a fair day's work for 8*s.* 4*d.* An American friend of mine, Professor John Gray, of the North-Western University, Illinois, to whom I have been of service in giving data regarding British labour for his returns to the American Government, wrote to me in the spring of this year about bricklayers' wages in America. The *Chicago Tribune* of February 14, 1903, contained reference to this subject. It says:—"Some 4,000 members of the Bricklayers and Stonemasons' Union have been granted a wage increase. The bricklayers have been getting 4 dollars 40 cents a day for eight hours' work, and they asked 4 dollars 80 cents. This was given them as a set scale, and to be in force for three years. The men also demanded a half holiday on Saturdays for six months in the year, and it was granted." This increase without a strike was equivalent to a rise of 10*s.* per week. Professor Gray added the following very expressive remark:—"It seems to me that, notwithstanding the numerous strikes in this country, our employers are more likely to grant demands, especially for increase of wages, than the English employer is, and to try to speed up to the new scale. I believe it costs less per 1,000 to get bricks laid now in Chicago than when men were paid 2 dollars 40 cents for ten hours' work, instead of the before-mentioned 4 dollars 80 cents for eight hours' work." This price is 2*s.* 6*d.* an hour! This would be an incentive to labour-saving machinery, one would think. America is not free from labour difficulties.

In connexion with this matter, I have been at some trouble to obtain data of English bricklaying under English superintendence. I will cite a few, all of which have been vouched for to me:—Great Northern Railway extension, Manchester. Foundations 3 ft. thick, hydraulic lime mortar, English bond; average, 1,760 bricks per man in 9 hours. The same building-stanchion foundations, blue bricks in cement, 1,056 bricks per man in 9 hours. The same building—3 ft. wall, both faces finished with blue picked bricks in cement; 704 bricks per man in 9 hours. The same building: Wall 18 in. thick, common brick in hydraulic lime mortar, English bond; wall faced one side in picked bricks; 846 bricks per man in 9 hours. On a job in Bolton: 18 in. wall, faced with selected bricks pointed up, 882 bricks per man in 9 hours. At the same job, in an abutment 8 ft. thick, faced one side with white glazed bricks in putty mortar, 909 bricks per man in 9 hours. All these bricks were laid by men on ordinary wages of 10*d.* per hour under Trades Union Rules, and without bonuses, etc.

Let me give you another fair instance of this class of work. We, my sons and myself, have recently erected a refrigerating store near the Market, Manchester. It has basement and sub-basement and nine other floors. It is faced on two sides with stock bricks, panelled with arches, and has terra-cotta mouldings, bands, cornices, etc. Taking basement walls, face work, setting round terra-cotta, windows, openings, lift recesses, etc., the brickwork from first to last averaged 750 bricks per man per day of ten hours on ordinary wages.

The most speedy erection of an ordinarily-finished building ever managed in Manchester was that of Peak's Warehouse, Portland-street, in that city. It was done by Robert Neill and Sons, builders, under us as architects. It will be of interest to you to know the methods adopted, especially as it was entirely initiated, organised, supervised, and executed locally. The building is a seven-storied warehouse for the home trade. There are three hoists, the usual counting-house, private office, kitchen, fittings, etc. Every wall and ceiling plastered, and the building generally well fitted up with counters, electric light, etc. It stands on 1,000 square yards of land, and faces into three streets.

The old building was gutted by fire on July 24, 1902. One side wall had to be taken down, one façade had the stonework of a floor to be replaced, and the back had to be half rebuilt. In rebuilding it was decided to adopt more modern planning, which necessitated different lines of columns, increased height, and new work even to the column foundations. The clearance of the debris and insurance matters took until September 7. On that date the contract was signed. At the time of signature complete drawings and details were handed to the contractors, Messrs. Robert Neill and Sons, Manchester. We arranged that the steelwork should be erected by the steel engineering contractor, so that this part should not be dependent upon anyone. We had arranged with a mill to commence rolling for us within twenty-four hours of receiving our instructions, and also with a foundry to work in three shifts of eight hours each to get the cast work out. The whole work was under the immediate supervision and organisation of Mr. Harold Heathcote, one of my partners, with a clerk of works to keep the progress notes, etc. The result of organising and looking ahead, spending 500*l.* for additional cost in pushed labour, and having

a first-rate building firm to deal with, resulted in the whole warehouse being completed and business resumed on January 24, 1903, or twenty weeks from signing the contract. The cost was about 23,000*l*. From the date of the contract to the time the whole of the iron columns, beams, and floor joists for seven floors, inclusive of ordering, making, and erecting, was only seven weeks, showing what can be done if one sets about it the right way. It was the result of trained organisation and preparedness.

I have mentioned the thought Americans have put into some lines of business to undercut our manufactures. Let me give one example in connexion with our building trade.

Perhaps in America the extremes of weather make it more a necessity to very carefully consider the question of heating buildings than with us. But it is of sufficient importance to our comfort and general health that our system and our appliances be as perfect as we could devise. Yet we did not as carefully study the subject as we might have done, until American competition has forced our manufacturers to do so effectually. It is an industry closely connected with buildings, so may be taken as an instance of how we did not master the subject as we might have done, and should probably have continued in complecent satisfaction had not American competition forced our heating-apparatus makers to do so for their own protection, and with the usual result, for some of our manufacturers are to-day producing cast sectional boilers and radiators equal to either American or French in price, finish, and efficiency, although not yet in as many varieties or of the largest capacity. If they will do this they will at least again command the market of their own country, and they may be trusted to then push forward the export of their wares. To obtain the best article, the American manufacturers concentrated their fullest thought, energy, and scientific knowledge upon the character of the metals best adapted to meet the various requirements of softness, non-porosity, smooth clean finish and uniformity of thickness in casting. This was specially directed upon what are known as sectional boilers, where enormous heating surface is required, where the pressure is high. With them method and standardisation are enforced in fitting and erecting, and in having the template of each member numbered and indexed before leaving the works, so that in the event of any of the component parts requiring renewing they can easily be duplicated. Large quantities of radiators have been shipped to Europe within recent years. One firm, at all events, was quite prepared to have their work done in France, because it was found that the French workmen bestowed greater care and interest on the moulding and casting of radiators, producing a most reliable and beautifully-finished article. These improvements, as I have said, were so materially affecting the English trade that the necessary incentive was created—the incentive of self-interest—and we are again holding our own. We shall do more than this if our manufacturers will give up their conservatism altogether, and increase the varieties, and also the capacity, of the heating boilers, and not need more foreign competition to jog them up again. We were slow to adopt the telephone, electric tramcar, the electric light, the motor car. We sometimes expect to compete successfully with those countries which adapt themselves to the quickly-changing conditions of life. It is our conservatism that is injuring us, and it might be added it is competition that is stirring us up. The young Englishman in this or any other business needs to devote more time to studying the technical details, learning the methods of other countries, and from that knowledge striving for high standard of workmanship, and enterprise in combination with originality. May I suggest that the Institute of Builders use their influence towards getting all apprentices to pass through building construction classes in the technical schools.

In very large buildings, where there is much architectural treatment involved, the architect is generally very fully employed in quietly, earnestly considering and working out the details of his design, and will perform that duty more whole-mindedly if not constantly diverted by personal superintendence as well. It may be worth consideration if there might not be with advantage in, say, great Government contracts, an architect, associated with the designing architect, who will have the entire charge of superintendence. And for each of these architectural positions the best man for English buildings is a trained, energetic, high-minded English gentleman. There are many men answering this description, and as capable as can be found in any land.

The question of labour is most difficult to answer. Quoting from a work by Mr. J. F. Fraser: "The raw material from which America produces its workers is the finest procurable in the world. America is not the dumping ground of the world's refuse. The immigrants into America are hardy Europeans discontented with the conditions in the old countries, but who have saved enough to set out and try their abilities in the new. Daring, pluck, and enterprise are necessary to break with family ties, and the men who have shown sufficient courage to do this are the very men likely to prosper wherever they settle." And this emigration is a great matter with us. In America, if a man does not work up to all that is in him he is discharged, for there are plenty coming by the next boat ready to take his place. With us our numbers of the best men are not thus increased, and the trades union sometimes discourage the good man to do his best, but encourage him to slow down to the level of the poor one. It is often the best men who emigrate, and their places are to some extent filled with an unrestrained pauper refuse from any country wishing to get rid of them. Is this reciprocity? Do we legislate, as I have said, in this, as in our Patent Laws, for our own country's benefit, and for the advantage of our own people? We are not as alive as we ought in common sense to be for our own interests. This immigration and emigration are serious items in the labour difficulty. It can only be restrained by our working men knowing they will have as much reward here as elsewhere in return for their best endeavours. Do you offer any rewards to your workmen for improvement of knowledge, for suggesting improvements, for specialised ability, thus giving them increased interest in their business. The American gets a real, honest joy out of his working. He likes it. His interest is in it. He is optimistic. He knows there are openings for his progress. He has a magnificent belief in his own abilities, and loves to read those papers which prove what a fine fellow he is, and how he overcomes the sleepy European. Enthusiasm is in the air. There is no do-nothing class supposed to be on a higher plane than business men. He sees the wealthy around him working as hard as he does.

His English fellow is taught by his Union that if an American lathe-turner works four lathes it is no reason he should be allowed to work more than two, caring not whether the trade thus leaves his employer, his country, or not. There is a greater readiness generally in the States to listen to the suggestions of the workpeople, and many of the labour-saving machines are the outcome of this better understanding, and if you look into it, you will find English brains well to the fore in inventions. The greater interest of the workman in his work, his endeavour to rise in the world, the better-schemed education he has received, and the readiness of the employer to listen to the suggestions of the improvements are all factors stronger in the States than in England. The sentiment in England that a man who belongs to an idle, leisured class is, for that reason, to be envied, forms a great drawback to progress and efficiency. The example to those less blessed with the world's goods does not tend to enthusiasm for diligent work. To see the wealthiest working hard in the business gives a solidarity of interests, a feeling of contentment to all engaged therein. An American's ambition for wealth and the power wealth gives is greater than ours. He will work longer hours, and when there is no need for it in order to add wealth to wealth. Whether, in the one life we have, this is a true and worthy ambition, is another story, not falling within the lines of this paper. The American employer considers the health and comfort of his people conducive to his own interests, and endeavours to meet this end by considering their welfare in the dining-rooms and conveniences of the workshop. In many works each man has a locker for his clothes, and has ample arrangements for keeping himself respectable in cleanliness and appearance. It must be admitted that there has been no lack of our Government interference on behalf of the English workman. Innumerable Factory Acts, Special Rules, Compensation Bills, Board of Trade Regulations, are in force here that have no existence elsewhere.

I believe we shall adopt many American business methods here, altering many of our conditions, and bringing about a more mutual appreciation of the difficulties between employer and employed. This is very necessary to modify the actions of Trade Unions in those directions for curtailing the output of material and hampering a free working man in doing the utmost he can with his labour, which is his capital. It is the old story in England. The first brick-making machines were invented in England, but the men working them were killed. The first building in Manchester where men dared carry bricks without the ordinary hod was the Town Hall, less than thirty years ago. Even then the contractors had to obtain the protection of the police. The whole fallacy of the Union's policy of allowing and encouraging a man to do less than a fair day's work in order that some other man may get a job, depends, it would seem, upon the false assumption that the amount of work to be done is a constant quantity. There is no limit to the work to be done here if we can do it quickly and economically, for there is no limit to human wants. I am indebted to Mr. Merttens, who says:—"Whilst unregulated and inorganised labour must be deprecated, the labour organisations must not block economic progress. The newest machines replacing costly labour must be adopted and be worked as cheaply and efficiently as possible, and the output increased wherever desired. To restrict the better-educated and more skilled workmen from doing the best and the most they can, is an economic fallacy, which, if persisted in, will utterly ruin the trade of England. With the adoption of machinery, wages have risen all over England; with the adoption of more modern labour-saving machinery American wages have risen still more. But the fault does not lie with the workers alone. Employers in England have yet to learn the economy and efficiency of high wages, and to acquire some of the intensity of application of their American competitors. The more they go and study their methods of combination and organisation, especially in economising labour, the better. There are, of course, many trades which are not as efficient in America as in England." And to a lecture by Sir William Bailey I am indebted for the following:—"Civilisation is the economy of force, whether it be intellectual moral, or spiritual, and if we can only persuade working men that the rewards are in proportion to the production, and that to get more work to do we must have the ability to produce more work in less time, because of the demand for cheap commodities, then something will have been achieved."

It would be very advisable of contractors to spend some time in the States closely and earnestly studying the methods of labour, combination, etc., mentioned. Americans are very hospitable, and will give you a genuine welcome. There is no hampering an American workman in his business. If he can set bricks he is taken on as a bricklayer, and the other workmen do not strike the job because he has not been a bound apprentice for four years. Here it is once a labourer always a labourer, but there you are a bricklayer if you can lay bricks.

There is also a spice of adventure about the American working man. He will cease to be a watchmaker and take to farming; give up newspaper reporting to start a constructive engineering company, a patent roofing or a patent flooring company; a builder's pay clerk will start in conjunction with a student for "electrical equipment in all its departments and permanent-way constructors." It is risky to himself and all who employ him, and shows nothing from which we can derive any benefit. The drink statistics show that the expenditure per unit here is just twice as much as in America. If our workmen would spend only one-half what they do in this line their wages would increase by their working on St. Monday, now an off day, and their savings result in scores of millions going into reproductive trade. We should not hear much then about the alteration of Fiscal policies, for we should be fully employed in one great boom of trade.

One way to lessen the difficulty with labour is to pay the best man the best wage you can afford him, so long as he gives you his best; make him to realise his best friend is his employer, and that it is his personal advantage to forward the employer's interests. In that manner you will retain the men you really need and give the natural incentive to the workman's

progress and advancement. Have you ever tried employment by piecework in building?

It is desirable to guard myself from the supposition that I think the struggle to accumulate money should be engrossing, and that it should be a main object of life. I am aware of the danger of allowing the consideration of industrial problems to obscure those of a social character. The productive activity of the people depends on their physical, moral, and intellectual qualities, and unless we improve these the industrial problem will hardly be solved. But I do maintain that whilst in business you should do it to the best of your ability, and if you can learn from your competitors any element of success and method it is a part of your duty to obtain it and act upon it with wisdom and with energy. And, further, business men should develop the power of initiation and improvement even upon those desirable elements that are to be gathered from others. We have not yet attained to the full perfection in anything, and the future is in the hands of the man with brains to think, self-reliance to carry out, and energy to complete. Many there are amongst us doing this now, making earnest, persevering efforts; but the wish to do it is far from universal, far from being the ambition that it should be, and, indeed, must be if we are to retain all along the line our position in the business world. And you may depend upon it there is great life and there are great possibilities for us all in our England, or we cannot otherwise account for the great love so many foreigners have for our land and their sensitive desire to share our good fortune and our trade. It is not necessary, either, to carry business to such excess as to make men into sleek and prosperous human animals and to lose the noblest qualities and prerogatives of life and manhood. All I suggest is the greater quickening inspiration in our methods, our intensity, our business life. The challenge is uttered in strong, clear, masterful tones to-day. Let us but answer it more fully than we are doing by the old British love of work and enterprise. This is the regenerating grace needed in our business world, and is the prophecy of prosperity.

The Chairman, Mr. William F. King, President of the Institute of Builders, said he was glad to hear Mr. Heathcote's valuable and interesting paper, and to know that that gentleman thought that Englishmen, instead of being the most conceited people in the world, were apt to belittle themselves rather too much; but, in any case, builders were always ready to learn, and he should like to hear something as to American scaffolding, as to their methods of haulage, and as to cranes and lifts.

Mr. Henry Holloway (Messrs. Holloway Brothers) said he had recently had an opportunity of visiting America, and of studying on the spot some of the matters mentioned. As Mr. Heathcote had said, Englishmen had some things to learn from American methods, for in some respects Americans were a little ahead of us; but the result of his visit was, from the building trade point of view, disappointing. Perhaps he had been led to expect too much. At the same time, there were many things to admire in the American methods. What struck him most was the energy and brightness of the American—his audacity, almost—in tackling big schemes. American builders and contractors ran enormous risks—risks which English business men would never think of taking—and that was probably due to the fact that there was not the dishonour in failure in the States that there is here. If an American started a big venture and came to grief, he found friends to help him, and he started again with enthusiasm, still honoured by others. He (the speaker) could corroborate what had been said as to the genial way in which Americans acted towards English visitors. His visit was a delightful one, because the Americans made it so. The great complaint Americans had against us is that we do not visit them as much as they would like. He greatly admired the splendid way in which Americans had developed the metal trades; in their bronze work, castings, etc. From the largest work down to the smallest detail, the work was beautifully done and reasonable in price. Any one interested in the metal trades here would learn more than would any one in any other branch of the building trade by going to America. But, having said so much, he could not say anything more that was favourable. The whole system of building in America—design, erection, and effect—was showy, temporary, and with a want of genuineness and permanency about it. Their sky-scrapers were architectural monstrosities, and he was very glad that the law in this country prevented such buildings being erected, and he should be sorry if any public body in this country ever gave encouragement for the development of such buildings. Mr. Heathcote had referred to labour-saving machines. He (the speaker) went to America particularly in order to learn what America could teach in regard to labour-saving appliances, and after careful investigation in most of the large cities—New York, Philadelphia, Boston, Chicago, Pittsburg, etc.—he found no machine that would be adaptable to English work that was an improvement on machinery in use in London. In some respects the American builders were behind us. Mr. Heathcote rather suggested that there was no difficulty with labour in regard to the adoption of machinery, but that was not quite correct. In the stone trades there was great difficulty with the men in regard to the use of machinery, and at the present time the rules regulating masons and employers provides that for every machine put in the shop the employer was to provide five men at the banker. Perhaps he ought to add that most of the masons working in America were either Scotsmen or Englishmen. He could emphasise what had been said as to supplying details. He found everywhere that it is an essential point in every job where speed was necessary, that every detail drawing that the contractor wanted was ready for him before he started the job. As to steel, it could be turned out and on to the job just as the American contractors wanted it—delivered on the job, morning after morning, as it was wanted. If English steel manufacturers would, or could, do the same, it would be a great advantage. The way the Americans were able to do this was as follows:—The steel was got ready and run out of the works on to the railways, and the railway companies ran it into sidings until it was wanted. Sometimes it was in a siding for three months, but the companies charged no demurrage. In large steel jobs, it was rarely that the architect designed the work; the contractor designed his own steel work, having his own engineers, and the architect was not even paid commission on the steel work. The contractor prepared his own drawings for the steel work in his own office, and the work was carried out under his direction. In addition to the staff of engineers in the contractor's office—he was speaking of large works—he had representatives with sets of drawings at Pittsburg, Philadelphia, and other places where the steel was manufactured, and these men saw the steel-work prepared for use. He quite agreed that Englishmen did not get credit for their work. He had an experience as to that. At a big hotel, he was admiring the glazed brickwork, which was some of the finest work he had ever seen. He took the trouble to inquire into the matter, when he found that the glazed bricks had come from Leeds. Everything was sacrificed to speed, and he was reminded of that in thinking about the glazed bricks. In a Boston building in the basement he noticed that the walls were faced with glazed bricks. There were no headers; they were all stretchers. He remarked to the architect: "You do not have bond in your brickwork." The reply was: "No; the walls are faced with the bricks simply as a decoration; we cannot stop to build it with the main wall." A two-brick wall was run up, and a workman came along later and treated the facework as decoration. Construction and beauty were sacrificed to speed, which was not what would satisfy here. As to the number of bricks laid per day, in some cases as many as 1,600 or 1,800 were laid per man per day in America, but it must not be forgotten that those bricks were smaller than ours, and were easier to handle. But such a high rate as he had mentioned had been obtained by constantly raising the men's wages, so that now they were receiving the equivalent of 2s. 3d. per hour. The employers were not prepared to go further, and the effect was that the number of bricks laid was now diminishing. At a large power station he visited, with an ordinary 2 in. wall, with red brick facing, he found that the men were not laying anything like 1,600 bricks per day, but that the actual number was about 800. He found that the general average number laid was about 1,200, and that the number was gradually diminishing; the high rate was kept up by giving exceptional wages. He had taken the trouble to find out how many bricks men here were recently laying. He took ordinary jobs, and he found that the number varied considerably—from rather more than 900 down to 500 per day, was the average was about 700. He found that exceptional circumstances altered the result. In a job of his own, similar to a job he visited in New York, he found that his men working under ordinary rules, were laying 1,400 bricks per day, and his experience was that bricklayers here were not far behind the Americans. When one came to consider quality, there was no comparison, for the American work was very rough, and the quality of the English work was far beyond American. The American bricklayer did not work from side scaffolding. With their system of steel construction, the steel went up ahead of the brickwork. The boom jib crane was used much as it was used on board ship, and this was raised floor to floor as the steelwork went up. Scaffolding was put out of windows, and was very roughly made, and trestles were used, with boards upon them. Our men would not tolerate such a dangerous system, and it was surprising what risks the Americans were ready to run. He saw a man some 150 ft. above the level of a road driving a rivet, standing on the flange of an iron girder without any protection. As to superintendence, on most of the jobs he visited, instead of a practical foreman such as we had, the superintendent or general foreman was a young man who had had a University training and had passed his civil engineering course at the college. Sometimes the superintendent had had a little training in the office, but generally he went on to a job direct from college, and at twenty-five years of age he was a "full-blown" superintendent of works. His main duty was not to see that the work was done well, but to "hustle" the sub-contractors. The large buildings were erected on the sub-contracting system. The general contractor had no yard or works, but he did everything from his office. The general contractor rarely employed direct labour, excepting bricklayers and fixers of steelwork. That system did not make for good work, although it made for larger profits and less responsibility to the contractor. As to joiners' work, that again was divided; one man making nothing but doors, another sashes, etc.

Mr. H. H. Bartlett said that such a paper as they had listened to was calculated to enlarge their minds. As to the American system of steel construction, it was a simple matter to build that way. The steel work was fitted together even to the last rivet before even it was brought on to a job, so that when the building was erected there was no doubt, no wondering, whether this or that would fit. Everyone knew where each part would go. English builders did not have these advantages. It was almost the universal practice here for the builder to have the details of a building supplied as he went along and as he was supposed to require them. If a contractor knew beforehand exactly what was to be done he could have his machines ready and could carry out the work rapidly. Not that buildings were any the better for being erected rapidly: slow building was generally lasting building. Building work of a most complicated and difficult character had been erected by English builders, and it had stood for ages. Not many years ago one of our leading architects, now dead, told him that work was done at such a rush that the pleasure of designing and carrying out a building had gone. That architect said that he liked to see a model of his building to see the effect of it; and he liked to see the building go up slowly, and to alter it, if necessary, for no man could tell what it would look like from seeing it on paper. By our present methods that was impossible.

On the motion of the Chairman, a hearty vote of thanks was accorded to the lecturer.

Mr. Heathcote, in reply, said that, as to the labour-saving machinery, he thought that Mr. Holloway had somewhat misunderstood him. He (the speaker) had alluded to labour-saving machinery, mainly in connexion with other businesses than the building trade, to show that Americans were always preparing something to do away with that expensive item labour. But he had noticed that the machinery American builders had, if not better than ours, was employed more generally. If we employed two machines for a particular purpose they would have half a

dozen in order to get over the work more quickly. The Americans took greater risks, and Mr. Holloway agreed with him there. These risks were taken to push the work on more rapidly, but he (the speaker) thought they erred in doing this. The scaffolding put up in London and most parts of England was such as a man could trust himself on, with little danger to himself, but that could not be said of all the scaffolding in vogue in America. He agreed with what had been said as to American bronze work and castings; they had taken great trouble to get the best metals for these castings, but the work was not equal to the French. The metal work in an American passenger lift was very good, and it was necessary to examine it carefully in order to find out that it was simply a casting, without any cutting or embellishing or finishing off. Such things were beautifully made, and in that respect we had something to learn from America. But we had nothing to learn from them as to constructional steel. A well-known American gentleman, who has had great experience in building, said in regard to the Trafford Park building: "This is as beautiful a piece of steel work as I have seen." The steel for that was supplied by Messrs. Dorman, Long, and Co., of Yorkshire. As to speed, that firm had put up for him (the speaker) more than 100 tons of steel work per day. Few firms could do as well as that. [Mr. Holloway: The Midlanders are better off than the Londoners.] As to the expedition of building work, he thought it was almost certain that we should have to alter some of our laws affecting buildings. If one had to build quickly, it was necessary to use steel construction; one could not build stone walls 4 ft. or 5 ft. thick as quickly as one could build walls by using steel stanchions. He understood that a steel building was to be put up in London on a site near St. James's-street, and the County Council insisted on having the walls as thick as though there were no steel in the building at all. That was not progress; the building would be stronger than if brick were used. In Manchester this point was appreciated, and architects were allowed to put up steel buildings with thinner walls than would be necessary without the steel, and the authorities there were helping in the matter of the speedy erection of buildings. As to the designing of the steel work for the Westinghouse buildings at Manchester, the steel contractors had nothing to do with the design of it; it was designed for them by the engineer, down to the very rivet holes. He (the speaker) had for work now in hand in his office a staff of engineers, and they turned out every detail of the ironwork. Nothing was left for the contractor to design. He believed that that was what the Americans did. [Mr. Holloway: There are exceptions.] He thought that the Americans made too much of speed, while we might speed up a little more with advantage, but retaining our good work. We did not want to sacrifice our good work, but to "speed it up."

The meeting then terminated.

MAGAZINES AND REVIEWS.

In the *Art Journal* Mr. Claude Phillips continues, and apparently concludes, his article on "Great Portrait Sculpture through the Ages." The article is written with much eloquence, and in general we entirely concur in the critical opinions expressed. The illustrations are happily selected; and the Rotrou portrait by Cafferi serves to remind one of the powers of a sculptor who has been rather forgotten in this country. Houdon's celebrated statue of Voltaire and his beautiful bust of Sophie Arnould, on opposite pages, give a dramatic illustration of the variety of power of this great sculptor. Mr. Phillips emphasises (and no wonder) the immense difference between the English portrait sculpture of the early and of the latter part of the nineteenth century. In fact, we can remember the time when the annual show of busts at the Academy was a kind of standing joke. There are very poor ones to be seen now, but they are in a minority, and English portrait sculpture has a life and *verve* of its own, though the best of it is based, as Mr. Phillips says, on the Florentine art of the Renaissance. Mr. Brock he regards as an exception in this respect—as a continuer of the old English school of what may be called downright portraiture, but in an improved form. An article on Bewick is specially interesting for the illustrations, in which a considerable number of photographically reproduced representations of Bewick's original brush drawings of birds are accompanied by reproductions of the line engraving into which he had to translate them for publication. Admirable examples of line work as they are, they are not equal to the original drawings. Messrs. Leslie and Eaton's essay on "The Royal Academy in the Nineteenth Century" introduces in this number the figures of George Jones, battle painter; Wilkins, the architect; Pickersgill, and Etty, giving as an example of the latter his best work, the "Nymph and Satyrs." In regard to Jones, who thought himself like the Duke of Wellington, the authors quote Wellington's caustic remark that "he was not aware that he had ever been mistaken for Mr. Jones," but they might have fairly quoted the Duke's more complimentary remark standing before one of Jones's battle pictures—"Good! Good! Not too much smoke"; a remark characteristic of the attitude of the practical soldier towards theatrical battle-pieces. A short article on a landscape attributed to Rembrandt in a Guildhall exhibition is evidently right in ascribing it to De Koninck; it is that painter's composition in every line.

In the *Magazine of Art* Mr. Spielmann's article on "Art Forgeries and Counterfeits" deals this month with "Modern Oil Pictures" and "Modern Antiques." The disclosures as to modern pictures and the tricks played with them are enough to make one's hair stand on end. Sidney Cooper would give a verdict on the genuineness of any picture professing to be his for a fee of 5*l.* (payable before the verdict was given), and he declared that out of 153 pictures submitted to him as his own not more than eleven were genuine. One of the cleverest frauds mentioned is that in which an eminent artist who never signed his pictures on the face was asked by a dealer to oblige him by signing it at the back, which he did. What he had signed was a copy inserted in the frame behind the genuine work, so that the dealer had now two "genuine" works, one really so, another authenticated by the signature on the back. An article on "Artistic Photography of To-day," by Mr. Horsley Hinton, gives illustrations of photographs by Mr. Alexander Keighley, who is called "An Impressionist in Photography," which afford more justification than most things of the kind we have seen for the assumption of artistic character in photography. They are so well arranged in regard both to composition and aerial effect as really to give the impression of pictures; but it is only in the line of "impressionism" that this kind of aim can be realised. As soon as a photograph is allowed to define too much, it at once proclaims the gulf between the photographer and the painter. Of the dining-room interiors given in Mr. Vallance's article on "The Furnishing and Decoration of the House" we prefer that designed by Mr. Logan, and carried out by Messrs. Wylie and Lochhead, except the table, the supports of which are somewhat heavy and clumsy-looking. The room is simple and severe in taste, as a dining-room should be. The experiment made in a room designed by Mr. Flockhart, of combining white metal with woodwork, we do not like as far as the furniture is concerned, with its metal "shoes." It is restless and spotty in effect. The practical remarks in the article as to the planning and arrangement of dining-rooms are sensible and useful. In Mr. Hamilton Jackson's article on "Electric Fittings of To-day," the metal examples strike us as rather showing the effort to be artistic than the achievement; too much effort and too little simplicity. The best things illustrated are really the two very simple wooden fittings designed by Mr. Ellwood. We cannot feel entirely in sympathy with the article on "The Arts and Crafts in France." There is a beauty of its own in much of this modern French work—and especially a beauty of execution; but the pretentious element is too much present. The paper knife in gilt bronze and ivory, for instance, by Laporte-Blaisser, ending in a woman's head with a butterfly head-dress, has the practical defect of being uncomfortable for the hand; besides that, the human figure, or a part of it, should not be used as a mere handle (in spite of much Renaissance precedent). The best thing figured in the article is M. Gaillard's sword hilt, with the dragon's head; the handle being symbolical, and at the same time good for the grasp. Convenience should go hand in hand with beauty in all articles that are to be handled.

The most interesting article in *Public Works* is that by Mr. T. W. Barber, M.Inst.C.E., on a great proposal for a barrage of the Thames at Gravesend, on somewhat the same principle as the Nile barrage, with sluice gates, the effect of which would be to convert the lower Thames into a great elongated lake of constant depth; and the oscillation backwards and forwards of the sewage poured into the river will be at an end. The advantages, as tabulated by the author, are so remarkable that the statement of them is worth quoting:—

"The immediate effects will be these:—

(*a*) The tides, Neaps and Springs, will be stopped at the dam.

(*b*) The river will be converted into a long lake having numerous affluents, the principal of which will be its natural flow over Teddington Weir.

(*c*) It will have a slow downward current, never reversed, so that all that enters it will pass downwards to the dam.

(*d*) Its level (normally at Trinity high water) can be regulated to any level above low water by the sluices.

(*e*) Within from 25 to 45 days of the closing of the dam the upland water will have pushed over the dam all the oscillating foul water of the tidal river, and thenceforward the water of the lake will be the same as that of the upper river, and any soilage in it must enter it by sewers or land drainage.

(*f*) There will thus be obtained by one work a navigable depth of water varying from 65 ft. at Gravesend to 32 ft. at London Bridge, without dredging or any interference with the river bottom or banks.

But the consequent effects upon the business and usage of the river will be tremendous:—

(*g*) Ships drawing 30 ft. can then proceed to London Bridge at any hour of the day or night, without waiting for tides.

(*h*) Ships of all tonnages and draughts can traverse the river, anchor anywhere, lay alongside any wharf or quay, always remain at one level for loading or unloading (an immense boon to shipowners and wharfingers), and need not lie out in the river or obstruct the free navigation.

(*i*) Dock entrances can be left open, thus saving the cost and time lost in working them. (The London and India Docks Co. estimate the cost of working their entrances at 50,000*l.* per annum.)

(*j*) There will be no mud entering the docks and backwaters, the water in which will freely circulate with the clean river water.

(*k*) Exceptional tides, being stopped at the dam, will not overflow the river banks as now sometimes happens.

(*l*) Reduced cost of towage, barging, repairing river banks, camp-shedding, quays, dredging, management, control and policing of the river.

(*m*) Greatly increased safety of navigation: no grounding, swinging with the tides, collisions due to tidal drift. The tides are responsible for most of these accidents, and for many lives lost—casualties which would not occur in a lake.

In addition to these there is a most valuable asset created in the advantage the new conditions open up for:—

(*n*) Pleasure traffic, boating and sailing, fishing, and the provision of efficient steamboat services, with fixed piers. London will be provided free with a lake of fresh water 45 miles long and from a quarter to half a mile wide. It is certain that this will give rise to extensive pleasure boating of all kinds, which will have ample room owing to the removal of all vessels from mid-stream anchorages to the shores."

There will be no more muddy foreshores and no stirring up of mud by tidal scour. The picture is a fascinating one, nor is the estimated cost very alarming in proportion, viz.: 3,658,000*l.* But there is one point the writer does not touch on: what will be the effect on the Thames mouth below the barrage? We should like to hear something on that head. Other articles of interest in the same number are on "The Water Supply of Vienna," on "Passenger Transportation Problems in Boston, U.S.A.," and on "Municipal Copenhagen." All these are fully illustrated. There is also an article by Mr. W. N. Twelvetrees on "The Engineering Standards Committee and its Work." We have not space to summarise these; but they are all full of information.

The *Berliner Architekturwelt* is filled with a variety of illustrations, from practical street buildings to those romantic sketches of monuments and cemetery gates, looking as they were hewn out of primæval rock by the people before the flood, which German archi-

tects are so fond of evolving on paper, though it can hardly be supposed that even on their own soil they find any opportunity of realising these dreams in a concrete form. The most interesting illustration in the number, however, is the design for a family sepulchre, or the front of it, in the cemetery at Weisensee, by Herr Dülfer, a Munich architect. This is a thing original and effective without any eccentricity. A design for a corona for lighting the foyer of the Frankfort Theatre, by Herr Seeling, of Berlin, is a good piece of work, shown in a coloured print. The practical buildings illustrated do not present anything for special comment.

The *Architektonische Rundschau* gives a perspective view and plans of the new Police buildings at Dresden, of which Baurat Julius Temper (Dresden) and Laudbauinspektor Carl Schmieden (Plauen) are joint architects. The plan is a slightly irregular parallelogram divided into three internal quadrangles by cross blocks; the exterior treated in a simple and severe classic style, with a circular block at the two main angles; here an order is employed on the upper story; in the remainder of the façade the effect is got only by the grouping and treatment of the windows. It is a solid and massive stone building, looking as if it was erected regardless of expense, and with some rich and rather effective carved decoration, not however of the most refined order. There is a bad effect produced in the first floor story of the circular pavilions by some clumsy corbelling out of the masonry courses, the object of which is not apparent, unless it represents blocks left for some carving not yet carried out.

The *Architectural Record* (New York) has a long article on "American Architecture of To-day," the illustrations to which are chiefly those of private houses. The author, Mr. Herbert Croly, commences by remarking that the United States has been passing through a great period of building activity, but that there is now rather a lull in this respect, and the season is opportune to consider the general architectural achievement during this period of activity, and the tendencies which it shows. And the main tendency, he thinks, is to confine American architecture to a very few prevalent types of design. "American architecture is still heterogeneous and indiscriminate enough; but it is not as heterogeneous and indiscriminate as it used to be. Certain special solutions of special architectural problems have been worked out, and have been largely adopted; and it is even more encouraging to note that these special ways of treatment and types of design, while open to many serious objections, all have some measure of propriety. It looks as if American architecture were becoming nationalised in very much the same way, if not to very much the same extent, that the architecture of modern England or France is nationalised." It is remarked that the use of brick is now very general, "and where brick is used, it is generally well used." The main point of the article, however, is that there is growing up a feeling for the adoption of standards of style based on precedent, and that this will tend to raise the character of American architecture. (The very great stress laid on French precedent of late years does not seem to be sufficiently recognised.)

"The difficulty with modern American architecture is that it started with nothing but vicious asociations, and the good architects have been confronted by the enormously difficult job of substituting comparatively good for the comparatively bad associations of the past. In so doing they have depended too much on obtaining an interesting variety of effect, and too little upon the value of repetition as an advertisement. Architectural repetition is in bad odour in this country, because in the past it has been applied chiefly to such dead and dreary material as brownstone fronts. Nevertheless the one sensible course for the future—the one course, which will provide both for a better quality of design and for a completer understanding between architect and client—is to make out of repetition a conviction and ideal. If the opportunities for repetition are studied with sufficient care, the necessary variety and novelty of effect will take care of themselves."

Of the other articles, one on "Brick Building in London," by Mr. D. N. B. Sturgis, draws attention to the examples afforded in some modern London buildings of this class, of unpretentious and inexpensive architectural treatment. "The Architecture of West Point," an article of considerable interest, by Mr. Montgomery Schuyler, describes and illustrates the important architectural additions and improvements which are contemplated or in progress at this great military academy. The design for the Riding Hall, in the accepted designs of Messrs. Crane, Goodhue, and Ferguson, is a striking one, but looks too much like a piece of a mediæval fortress.

The *Nineteenth Century* contains what is in many respects an interesting article by Mr. C. L. Eastlake on the administration of the National Gallery; an article chiefly historical in its nature. There are two architectural criticisms in it to which we may refer. The one is in regard to the defective lighting of Edward Barry's galleries, in consequence of the double skylight, a flat glass roof under a sloped one, the former of course a regular dust holder. We commented on this years ago, and pointed out the far better effect of the single roof put up by Sir J. Taylor for the Office of Works. The other is the closing sentence in praise of the front of the building, of which it is said that "no public building has been so unjustly abused by the public." As a matter of fact the public neither praise nor abuse architecture, they do not care enough about it to do either. But this maintenance of the façade of the National Gallery as being a design worthy of its splendid position is really as a mere kind of hereditary superstition. It is a poor concern, and no special pleading will make it otherwise.

In *Scribner*, under "The Field of Art," Mr. Russell Sturgis and Mr. Frank Fowler go into what we should be rather inclined to call a rhapsody over Mr. Sargent's new wall painting in the Boston Library, of which the centre figure in bas-relief, the Crucifix, was exhibited two or three years ago in the sculpture-room at the Royal Academy. It is, we presume, treated as a coloured relief in the midst of a picture. American critics have a way of rhapsodising over everything that is produced by an American artist and decorates an American building. It is a pity that they cannot see their way out of this very self-regarding attitude, and try to look at things from an independent and truly critical standpoint. If they could do so, they would perhaps perceive that it is a question whether the decoration referred to is not far too Byzantine, too imitative of ancient art, too expressive of feeling for a superstition long since dead, and only indulged in modern life as a kind of æsthetic and religious pose, to have any fitting place as decoration to a modern library. But probably they would say that "it were to consider too curiously to consider so." Mr. Penfield's "Holland from the Stern of a Boeier" (whatever that may be) is worth notice for its author's coloured illustrations of buildings, people, and country, produced in chromolithography, in a simple and restricted colour scheme, but admirably characteristic and effective.

In the *Century* Miss Wharton's "Italian Villas and their Gardens" is continued, treating in this number of Sienese villas, and adorned with three illustrations by Mr. Maxfield Parrish, reproduced in chromolithograph and evidently designed and coloured *ad hoc*; not representing the real tones, but very effective notwithstanding, especially Vicobello, with its cream-tinted marble alcove in front of the brown masses of the trees.

Harper contains an article of great interest by Mr. G. H. Darwin, on "The Birth of a Satellite," especially concerned with the probable cause and manner of the formation of the moon from the primary mass in which it and the earth were first combined. It is a purely scientific article, illustrated by diagrams to render the reasoning employed obvious to the eye as well as to the understanding.

The *Cornhill* contains an article entitled "Whistler the Purist," by Mr. Morfimer Menpes, chiefly interesting in regard to personal traits. It appears that Whistler carried his ideas of art into everything, and was very particular as to the cut of his coats being in accordance with æsthetic ideals (to the bewilderment probably of his tailor). The account of his dealings with the Society of British Artists, who rashly made him a President and found they had exchanged King Stork for King Log, is amusing enough.

The *Revue Générale* contains an article by Dr. Moeller on "La Question des Sanatoria," which is useful as collecting together the opinions of sanitarians of different countries. Of the important question as to the best kind of building, so much discussed in England at present, he however says nothing, and does not even seem to be aware of a difference of opinion on the subject.

The *Antiquary* contains an article by Mr. Bailey-Kempling on the antiquities of Heysham, an old-fashioned village near Morecambe Bay, and "Breadsall Priory," one of Mr. Bailey's "Ramblings of an Antiquary," illustrated by sketches. Breadsall was the residence of Erasmus Darwin during the closing period of his life.

Knowledge contains a valuable article on "The Sunspots of 1903," by Mr. Walter Maunder, and one by Mr. W. F. Denning on "The Markings and Rotation Period of Saturn," a planet the study of whose main orb has been rather neglected owing to the exceptional and attractive problem presented by his rings.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A MEETING of the members of the Association of Municipal and County Engineers, arranged by the Metropolitan district, was held at the Municipal Officers' Club, Whitehall, on Friday, December 4, to discuss further the new drainage by-laws of the London County Council. The meeting was adjourned a month ago for the purpose of communicating with the remaining metropolitan surveyors to see if it were possible to arrange a uniform method of procedure throughout the metropolitan area. Mr. W. Weaver, C.E., of Kensington, President, was in the chair, and there were present Messrs. R. J. Angel (Bermondsey), W. Nisbet Blair (St. Pancras), J. Rush Dixon, hon. district secretary (Shoreditch), P. Dodd (Wandsworth), R. M. Gloyne (L.C.C.), Arthur Harrison (Southwark), P. G. Killick (Finsbury), H. J. Marten (Wandsworth), F. Sumner (Woolwich), and Oliver E. Winter (Hampstead).

Before beginning the business of the meeting the President expressed deep regret at the great loss which the profession had sustained by the death of Sir Frederick Bramwell.

The President, in reopening the discussion on the new by-laws, said he expressed his views a month previously as to the desirability in the interests of the public of one general system being adopted in all the London boroughs for carrying out the new drainage by-laws of the London County Council, and by such unanimity of working avoiding the present divergencies of practice. As many of the borough surveyors were not present at the previous meeting it was resolved to address a circular communication to each of them, enclosing copies of the forms which he had prepared, and inviting their suggestions for improving the forms in conjunction with the new by-laws. Only seven surveyors had forwarded suggestions, and the silence of the others might be interpreted in two ways—either they had no proposals to make on the suggested course of procedure, or they preferred to keep to their several modes of procedure. As he was of opinion that the second reason was the correct one, he was afraid there was little use in some of them endeavouring to bring about unanimity of practice. Such a desirable improvement must be left to the Local Government Board or the London County Council, to bring about by some future general order, begotten of public opinion aroused by the inconvenience and difficulties which would, without doubt, arise from the onerous requirements of the new by-laws. Personally, he begged to thank those brother surveyors who had favoured him with their suggestions and the meetings with their presence, and he could only express sympathetic regret that the others were prevented from joining in the deliberations of their more fortunate and less-worked brethren. Without doubt it was a tax on a busy official to ask him to devote his well-earned leisure to a task presenting no chance of profit or pleasure.

The Hon. Secretary (Mr. Rush Dixon) then read the following communications:—

Mr. Thos. Corfield (Deptford), in his communication, said he saw no objection to the Kensington form being adopted.

Mr. Harley Heckford (Poplar), referring in his letter to Form No. 2, expressed the view that the word "intend" required space for the addition of "s" in case of a single applicant. The situation of premises should not be described by words "being the. . . . premises. . . . from. . . ." Such a description was more or less vague, and liable to distortion by applicant; moreover, it was not required, as the previous wording, and especially the fact of a proper block plan having to be submitted, rendered any difficulty in location im-

possible. As plans drawn in ink upon tracing linen would undoubtedly have to be accepted under the new by-laws it would be advisable not to have space upon the form or plan, but rather to ask for tracings on linen in every case; and as the scale was optional (not less than 16 ft. to 1 in.) the publication of a scale would lead to greatly disfigured application forms. Moreover, there was not sufficient room to give the necessary plans upon the space provided. As to form No. 2b, he was not favourably inclined towards the asking of a deposit of 2*l.*, which, of course, could not be enforced, nor did he think the surveyor of a borough should be either called on to undertake, nor should he for his council adopt, such a business as the making of plans for private persons. He might further say that paragraph 2 of the by-laws relating to additions, partial constructions, etc., appeared to include every known alteration that could possibly take place in drainage work, and the proviso to nullify entirely the import thereof; and he was of opinion that a definite line of policy should be clearly adopted as to when and when not a plan was required.

Messrs. H. Marten and P. Dodd (Wandsworth) suggested certain amendments of the Kensington forms, and that regulations similar to those attached to Form No. 2 should be inserted in place of the detailed description in writing. The practice in Wandsworth was to approve all plans subject to the Borough Council and the County Council's by-laws and regulations. They thought that that was very much better than to ask builders for detailed description in writing, as on the Kensington form, while it would ensure better work and remove a great deal of unnecessary responsibility from the surveyors and inspectors. As to the duties of the surveyors and medical officers of health in connexion with drainage of new and old buildings, the following resolutions had been adopted by the Wandsworth Council—viz., (1) "That the public health work, except reconstruction and repairs of drains and sanitary fittings, be under the supervision of the medical officer of health." (2) "That the matters of drainage and sanitary fittings and repairs be under the supervision of the surveyors." The writers' experience was that this system worked admirably, and they did not think it desirable to adopt Mr. Weaver's suggestion that the medical officer should report all repairs and minor alterations to the surveyor.

Mr. M. W. Jameson (Stepney) intimated that he quite agreed with part of Form No. 2, but thought that duplicate plans should be insisted upon. He hardly saw the necessity, however, for the applicant having to fill in the page "Detailed description in writing," as surely all those details were fully covered by the requirements of the by-laws. With respect to Form B, as the deposit of 2*l.* could not be legally enforced he thought it should be removed from the form.

Mr. William Oxtoby (Camberwell), in his letter, agreed that it would be a good thing to obtain uniformity in London with regard to drainage matters. The Camberwell form (a copy of which accompanied the communication) differed, he thought, only slightly from the general run of forms.

Mr. E. E. Finch (Bethnal Green) expressed the view that Form No. 2 should be larger, and that the detailed written description, with the exception of the first clause, should be omitted; that only the first by-law should be printed; that provision should be made for endorsing on the forms the order of the Council; and that the last part of Form 2*b*, relating to the deposit of 2*l.*, should be omitted.

Mr. R. J. Angel, Bermondsey, was of opinion that the form submitted by Mr. Weaver was too cumbersome. The small jobbing builder, with whom many of them had to deal, would not be able to fill up such a form intelligibly. Then he did not think the numerous questions to be necessary. It was no use asking a man what he would do, and at the same time telling him what he must do. The position and size of the drains were all set out on the plan, and as the builder had to carry out the work according to the requirements of the London County Council by-laws, that was sufficient. At the previous meeting Mr. Weaver had suggested that in cases of urgency the plan should be drawn in the office. He, for one, should certainly not allow that in his district. Why should they do architects out of legitimate work? There were men in their various districts who earned a livelihood by making these drainage plans and other work which came to them, and he would never countenance taking such work and doing it in the office. They would simply be increasing their own work to the detriment of some one else. Then there was the question as to how the work should be divided between the different departments. In Bermondsey they considered the sanitary inspector was a nuisance inspector, who searched out nuisances and rectified them, and they kept him to that. The surveyor did the whole of the original drainage work.

Mr. Dodd, Wandsworth, believed that in ninety-nine cases out of a hundred a block plan showing the drain would be sufficient. He could quite understand that if they had to carry out the duties of a District Surveyor or a county surveyor, where they had to see to the thickness of walls, damp courses, etc., that a detailed plan would be required.

The President wished to know how a block plan would meet the requirement of by-laws, Sections 3 and 4, which required them to show the positions of all windows and other openings into the buildings, and the height and position of all chimneys.

Mr. Dodd mentioned that Section 1 only required such plans, sections, and particulars of the proposed construction as might be necessary.

Mr. Blair, St. Pancras, remarked that Section 1 did not cover Sub-section 3.

Mr. Sumner, Woolwich, considered the detailed description in writing necessary. It made the architect think out the matter when submitting a plan to the Local Authority. He proposed that a Committee of six be appointed to consider the various suggestions, and to draw up a draft form to be submitted to the surveyors of the various London Councils.

Mr. Dodd, Wandsworth, seconded the proposition.

The President, before putting the resolution, said he did not want the meeting to put a somewhat onerous duty upon half-a-dozen gentlemen unless they were fully convinced that some good was likely to result.

The resolution was carried, but the meeting failed to constitute the Committee.

Mr. W. N. Blair, St. Pancras, declined to serve on the Committee. His reasons for voting against the resolution was that he felt it would be love's labour lost. They had taken a good deal of trouble in St. Pancras in remodelling their drainage form, and as it had been approved by the Committee, he could not go and ask them to alter it.

The President also asked to be left off the Committee. He did not shrink from work if he could see any result, but he did not see any possibility of practical results.

Mr. Winter, Hampstead, said he was in the same position, as he had just settled a form with the medical officer, and it had been approved by the Committee. The form followed somewhat on the lines of Kensington, but they did not make provision on it for a plan.

Mr. Rush Dixon, Shoreditch, thought it a pity they could not obtain more unanimity of practice among London surveyors.

Mr. Sumner, Woolwich, said he had prepared his form, but had kept it back until after the meeting.

Mr. Martin, Wandsworth, also mentioned that he had kept his form back in the hope that they might be able to get a common form for the Metropolis.

A vote of thanks having been accorded to Mr. Weaver for presiding, the proceedings terminated.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday in the County Hall, Spring Gardens, Lord Monkswell, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Greenwich Borough Council, 4,500*l.*, for erection of buildings at depot; Lambeth Borough Council, 2,926*l.*, for paving works; and Stepney Borough Council, 2,400*l.*, for street improvement. Sanction was also given to the following: Hackney Borough Council, 1,000*l.*, for street improvement; Hampstead Borough Council, 14,145*l.*, for electric light installation; St. Pancras Borough Council, 10,000*l.*, for electric light installation; and Stepney Borough Council, 1,902*l.*, for a similar purpose.

Westminster Improvement: Housing Accommodation.—On the recommendation of the Improvements Committee it was agreed that the account of the Westminster improvement be debited with a sum of 50,000*l.* in respect of the accommodation provided at Millbank for the rehousing of the persons of the labouring class displaced in connexion with the improvements.

Tramways: Pimlico Electricity Generating Station.—The Highways Committee recommended, and it was agreed:—

"That the estimate of 64,000*l.*, submitted by the Finance Committee, be approved; and that expenditure of sums not exceeding that amount in all be authorised for the acquisition, under the compulsory powers conferred upon the Council by the London County Council (Tramways and Improvements) Act, 1903, of the freehold and leasehold interests in property required, and the provision of a site for the accommodation of persons of the working class to be displaced, in connexion with the erection of an electricity generating-station at Pimlico, for the working of the tramways in the western portion of the County of London."

Housing.—The following recommendations of the Housing of the Working Classes Committee were agreed to:—

"That the estimate of 20,840*l.*, submitted by the Finance Committee, be approved; and that expenditure not exceeding that amount in respect of the erection of Wenlake-buildings, Roby-street, St. Luke, be sanctioned.

That the tender of the Haslemere Builders, Ltd., amounting to 18,861*l.*, for the erection of Wenlake-buildings, be accepted. . . .

That the housing value of the site of Wenlake-buildings be fixed at 5,000*l.*; and that it be referred to the Corporate Property Committee to take the necessary steps to effect the transfer to the buildings account at the proper time."

The buildings will consist of two blocks of five story balcony dwellings, which will provide accommodation for 496 persons in 25 tenements of two rooms, 45 tenements of three rooms, and 15 tenements of four rooms, and one cottage of three rooms.

Mr. A. Smith said he hoped the Committee would remember that there was a Works Department, as several times lately they had passed it over.

Mr. Bruce replied that the Committee were bound to make both ends meet. The Committee was friendly to the Works Department, but lately the architect's estimates had been such that if the work had been undertaken by the Works Department at this figure there would have been a loss on the schemes. The Works Department was bound to accept the work at the architect's estimate, and therefore the only chance the Committee had of getting the schemes carried out was by contractors tendering below the architect's estimate.

Claim for Compensation.—The following recommendation of the Main Drainage Committee was agreed to:—

"That the seal of the Council be affixed to the appointment of Mr. John Henry Clutton as sole arbitrator with regard to, and to the formal offer submitted herewith in satisfaction of, the claim of Messrs. W. H. Lascelles and Co. for damage to their property at Sugar-house-lane, Stratford, through the construction of the Hackney Wick to Abbey Mills relief sewer, . . ."

Sewage-polluted Watercress.—The Public Health Committee recommended, and it was agreed, that inquiries be made by the medical officer of health with regard to the condition of watercress beds in the county of London, and that he be instructed to extend his inquiries to sources outside the county from which watercress is supplied to London if it is found practicable to do so after a preliminary investigation.

A Site for Council Premises.—In answer to a question, the Deputy-Chairman said that the Establishment Committee was constantly on the look out for new offices, and the Sub-Committee had agreed to recommend that some premises be taken in the immediate neighbourhood. A meeting of the Sites Committee had been called for Friday next at 3 p.m. The Committee at its last meeting did not think the present a very opportune time to press forward any large scheme. Although the Government was desirous of knowing the views of the Council at an early date as to the vacant land they are clearing opposite the County Hall, yet they very considerately would not take any action without first giving the Council an opportunity of considering the matter further.

Belgian Rails.—Lieutenant-Colonel Rotton moved, and Mr. Gaskell seconded:—"That it be referred to the Highways Committee to ascertain and report to the Council (*a*) the number of hours of labour per week worked by the men employed by the Belgian firm in making rails for London tramways, and (*b*) the rate of wages per hour paid to such men, and if they do any work on Sundays in connexion with the manufacture of such rails."

After considerable discussion, Mr. McKinnon Wood moved an amendment as follows:—"That it be referred to the Highways Committee to ascertain and report to the Council (*a*) the number of hours of labour per week worked by the men employed by foreign firms making the rails for the Government, provincial Corporations, London tramways, and railways; (*b*) the rate of wages per hour paid to such men, and if they do any work on Sundays in connexion with the manufacture of such rails; and (*c*) the amount of mining royalties paid by foreign firms as compared with those paid in Great Britain."

Mr. Ward seconded the amendment, which was carried.

Tenants and Land Tenure.—Mr. Lewis moved, and Mr. Dickinson seconded, the following:—"That it be referred to the Corporate Property Committee to consider and report as to the means by which the Council could offer to prospective tenants of its surplus lands fixity of tenure at a fair rent with rights of property over buildings they have erected."

Mr. Bruce moved an amendment to delete the words "means by which the Council could offer," and insert the following: "desirability of the Council offering."

After discussion this was agreed to.

District Surveyors and Salaries.—Mr. Dew moved:—

"That it be referred to the Building Act Committee to report whether it is advisable that the Council should exercise the powers, conferred upon it by section 158 of the London Building Act, 1894, to pay fixed salaries to the District Surveyors instead of their being remunerated, as at present, by fees; with due regard to the statutory responsibility of the District Surveyors for the stability of buildings, etc., being in no way lessened."

He said he did not make this motion out of any hostility to District Surveyors. There were some splendid men serving London in this capacity, but he thought the Council would be well advised to bring them under the more direct control of the Council by abolishing the present arrangement, and paying them a fixed salary. It was absurd that the man who watched the builder to see that he carried out his work properly should yet be able to collect a fee from him.

Captain Hemphill, Chairman of the Building Act Committee, said his Committee were prepared to accept this motion, as it was only a motion to report as to the advisability of paying fixed salary. The Building Act Committee did, on June 11th, 1890, present a report to the Council on the subject, in which they thought it was undesirable to pay District Surveyors fixed salaries. However, there might be other facts to be brought forward, and the Building Act Committee would accept the motion. He might mention two or three cases bearing on the subject. The first was as to the Royal Aquarium, in connexion with work as to a small wooden bridge. The surveyor proposed, and was entitled, to charge 75*l.* in fees, which was a great deal more than the cost of the proposed work, for, according to the Act, he was entitled to charge on the whole building. In another case, a gentleman in Mayfair had some small work done to a balcony, and he had to pay 4*l* 5*s.* in fees, which was more than he had to pay for the repairs. In another case, in Southwark, an inquiry was made into the condition of some coping of houses, and if the District Surveyor had been called in the fees would have amounted to 250*l.*

Mr. Campbell said the Council was more likely to get good work under the present arrangement than under the one proposed.

The motion was then agreed to.

Water Companies' Charges—Dr. Fletcher Little moved: "That in view of the large sum claimed by the London water companies based on receipts from rates levied on coach-houses, stables, outhouses, and gardens, in addition to the amount already levied on the rateable value of the whole premises, the attention of the Metropolitan Water Board be called to the subject." This was agreed to.

The Council then adjourned.

Illustrations.

CHURCH OF ST. PETER, LOWESTOFT.

THE design illustrated shows a building intended to replace the existing Church of St. Peter, which was built about 1835, and is quite inadequate in size and arrangements for a greatly increased congregation. The chancel, morning chapel, with organ chamber over it, and the vestries have now been built; the nave is left for the future, and a further accumulation of funds.

The walls are faced with red brick, all the dressed stonework is in Casterton stone, the roofs are covered with "sea green" slates. A large reredos in triptych form, given by Mr. B. A. Charlesworth, and containing a coloured centre panel of the Crucifixion, in low relief, by Mr. R. Anning Bell, and painted wing panels by Mr. W. D. Adams, is to stand behind the altar. Painted glass, by Mr. Christopher Whall, is to fill the east window.

The church is planned with passage aisles, to seat 550. The architect is Mr. E. P. Warren, of London, and the builders Messrs. Collins and Godfrey, of Tewkesbury.

"BUCKLAND," BRECKNOCKSHIRE.

THIS house was erected some years ago, from the designs of the late Mr. S. W. Williams of Rhayader, whose name will be in the memory of many of our readers as an accomplished archæologist as well as architect, and as the author of an excellent book on the remains of the Abbey of Strata Florida. He was a member of the Institute of Architects and of the Society of Antiquaries, and for some years before his death was County Surveyor for Radnorshire.

The previous house, an ancient one, was entirely destroyed by fire, and the one here illustrated was built to replace it. It is built of a purplish grey stone (Silurian formation) quarried on the estate, with dressings of red Hollington stone, the roofs covered with green slates.

The principal feature internally is a large central hall (58 ft. by 38 ft.) panelled in oak and with a coffered ceiling. The billiard-room and drawing-room open out of the hall, and the dining-room is contiguous to it. The staircase, wainscotted in Austrian oak, leads to an arcaded gallery from which the principal suites of bedrooms open.

As the house was built on the site of the old one, the question of aspect—south-west—was settled by circumstances.

ELECTRIC GENERATING STATION, IPSWICH.

THE Ipswich Electric Generating Station, which we illustrate this week, was opened on the 21st November. It is a very complete example of a municipal undertaking of this kind, the whole of the electrical department of the Corporation being placed on the same site as the power station and car shed.

The administration department faces Constantine-road, the entrance being placed centrally, with accountant's department to the left on entering, and tramways department on the right. The engineer's office and meter department are on the first floor. At the back of the administration block is a large workshop, communicating with the tram car shed at one end, and the engine-room at the other, and is conveniently placed for the work of both departments. Tram rails run through it to the engine-room. The engine-room is faced internally with white glazed and blue Staffordshire bricks. The floor is covered with red adamantine tiles, the roof is constructed with steel principals and covered with patent dry glazing. The switchboard is arranged on a gallery on one side of the engine-room. Immediately behind is the battery-room and chamber for mains leaving the station.

The site is on the banks of the River Orwell, the water of which is used for condensing. The general level of the site is low, the subsoil water being only a few feet below the surface, consequently all important parts of the building are raised above ground level, including main flue, which is above the ground.

The tramcar shed is 180 ft. long and 87 ft. wide, with a roof in three spans supported between the main walls by columns. There are eight sets of lines, providing accommodation for 40 cars, and the usual workshops for painting, etc.

The buildings externally are faced with red kiln-burnt bricks, with Bath stone and white Suffolk brick dressings. The two pediments of the front elevation are rendered in cement, with moulded enrichments around the circular windows. The roofs of the administration block are covered with permanent green slates.

Mr. S. A. Kenny, of Ipswich, was the builder of the power station, administration block, and tramcar shed. Messrs. Shillitoe and Son, of Bury St. Edmunds, were the contractors for the chimney shaft and destructor building. The roof glazing was executed by Messrs. Mellowes, of Sheffield, the iron windows by the Crittall Manufacturing Company, of Braintree, Essex. The steel work was carried out by Messrs. Dorman, Long, from the designs of the architect, the white glazed bricks were obtained from the Farnley Iron Company, the stone from the Bath Stone Firms, the red bricks and the Suffolk facing bricks were supplied by Messrs. Bolton and Laughlin, of Ipswich.

Messrs. Kennedy and Jenkin, of Westminster, are the engineers, and the architects are Mr. C. Stanley Peach and Mr. C. H. Reilly, of Westminster.

THE SURVEYORS' INSTITUTION.

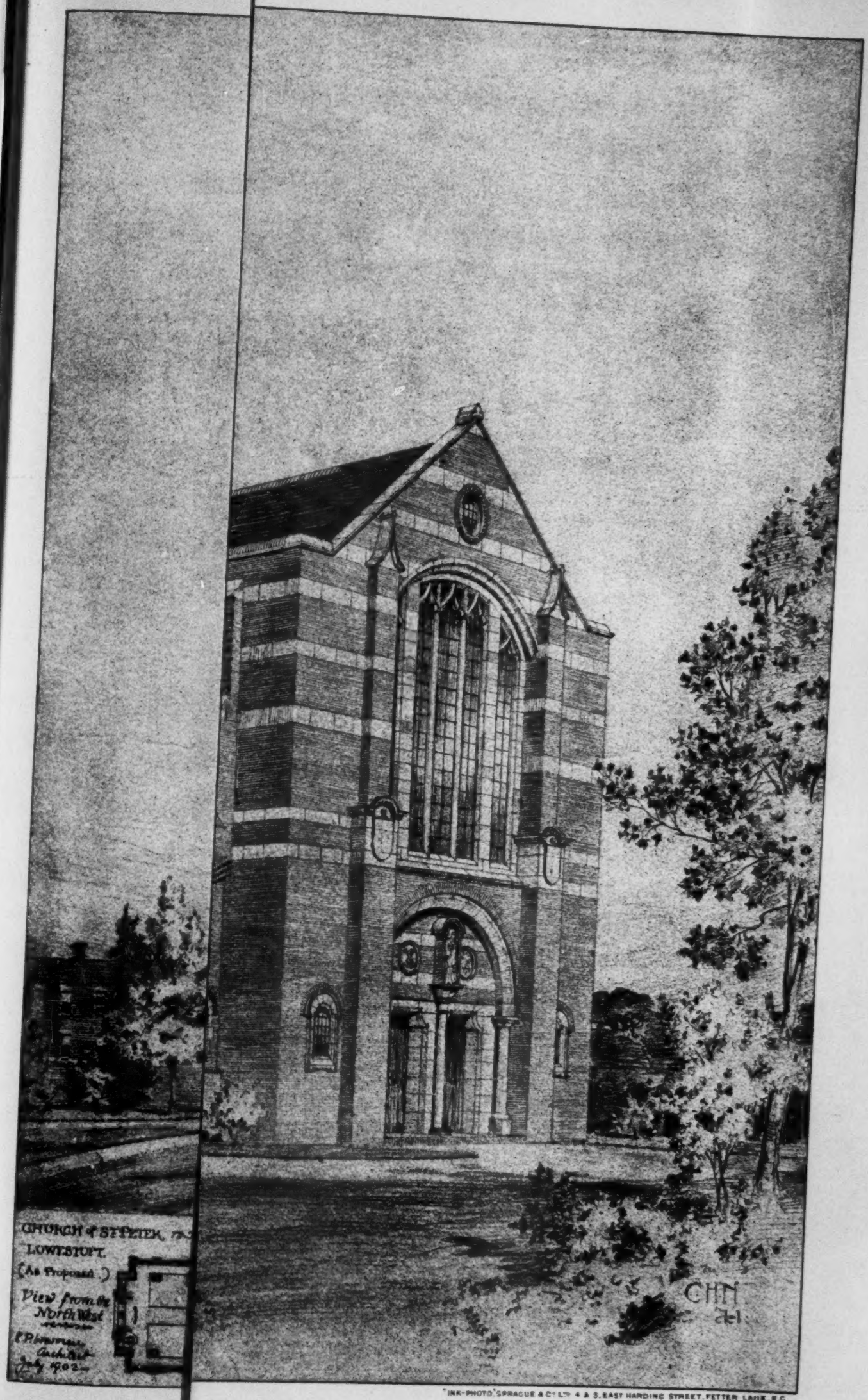
PRESERVATION OF TIMBER.

AN ordinary general meeting of the Surveyors' Institution was held on Monday afternoon at No. 12, Great George-street, Westminster, Mr. A. Buck, President, in the chair.

Mr. J. W. Penfold, Hon. Secretary, having read some donations to the Library and Library Fund, and a vote of thanks having been accorded to the donors on the motion of the President,

Mr. E. T. Scammell, F.R.G.S., read a paper entitled "The Preservation of Timber, with Special Reference to its Protection from Dry Rot and the Increase of its Usefulness for Estate Fencing and other Purposes." Having referred to some samples of treated wood, which he had placed on view for inspection, to the importance of the preservation of timber to the United Kingdom, and to the fact that the supply of timber is rapidly decreasing in all parts of the world, he said that the wholesale destruction of the forests of the old world and the new for the legitimate purposes of land settlement, agriculture, and trade, and the wasteful methods often employed in the supply of these needs, to say nothing of the enormous areas of forest destroyed by fire, had brought us within measurable distance of a timber famine. He mentioned this in order to bring into prominence the necessity, not so much of conserving and developing the forest resources of the world and thus repairing the waste of past and present years, as of adopting such means as science brought within our reach of preserving the timber itself. If it is possible, as many think, to render timber less subject to decay and consequently more durable, and to make it even more fit for industrial uses, by methods of preservation, then no effort should be left untried to secure this important result. Another reason of considerable weight, which lent encouragement to such effort, lay in the fact as expressed by Dr. Von Schrenk in his paper on "Seasoning of Timber," issued by the United States Department of Agriculture, that "much standing timber of varieties now worthless for constructive purposes, owing to its rapid decay, may be made commercially valuable by preservative processes." The lecturer, proceeding, said he wished it to be clearly understood that he did not propose to enter into a technical discussion of the merits of the various processes of which he would treat. He desired rather, from the information he had gained, to lay before them some facts.

The causes of decay in wood were mainly fungi, bacteria, insects, and worms. Fungi, in various forms, were parasites of the living tree, and often so affect it as to render it useless for industrial purposes. But they also act as agents of decay, in the same or other forms, in the tree after it has been felled. The most important of the fungi that affect converted timber were the merulius lachrymans, which produced the disease so well known and so much dreaded, dry-rot. "The spores of this fungus," said Professor Boulger in his book on "Wood" (1902), "germinate on damp wood, provided some alkali is present, such as the ammonia fumes in stables. Then under the influence of warm still air (in the absence of



"INK-PHOTO" SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

d the usual workshops for paint-

gs externally are faced with red
cks, with Bath stone and white
dressings. The two pediments
levation are rendered in cement,
enrichments around the circular
roofs of the administration block
ith permanent green slates.
enny, of Ipswich, was the builder
tation, administration block, and
Messrs. Shillitoe and Son, of
nds, were the contractors for the
and destructor building. The
as executed by Messrs. Mellowes,
e iron windows by the Crittall
Company, of Braintree, Essex.
rk was carried out by Messrs.
, from the designs of the archi-
glazed bricks were obtained from
on Company, the stone from the
rms, the red bricks and the Suf-
ricks were supplied by Messrs.
aughlin, of Ipswich.
nedy and Jenkin, of Westminster,
ers, and the architects are Mr. C.
and Mr. C. H. Reilly, of West-

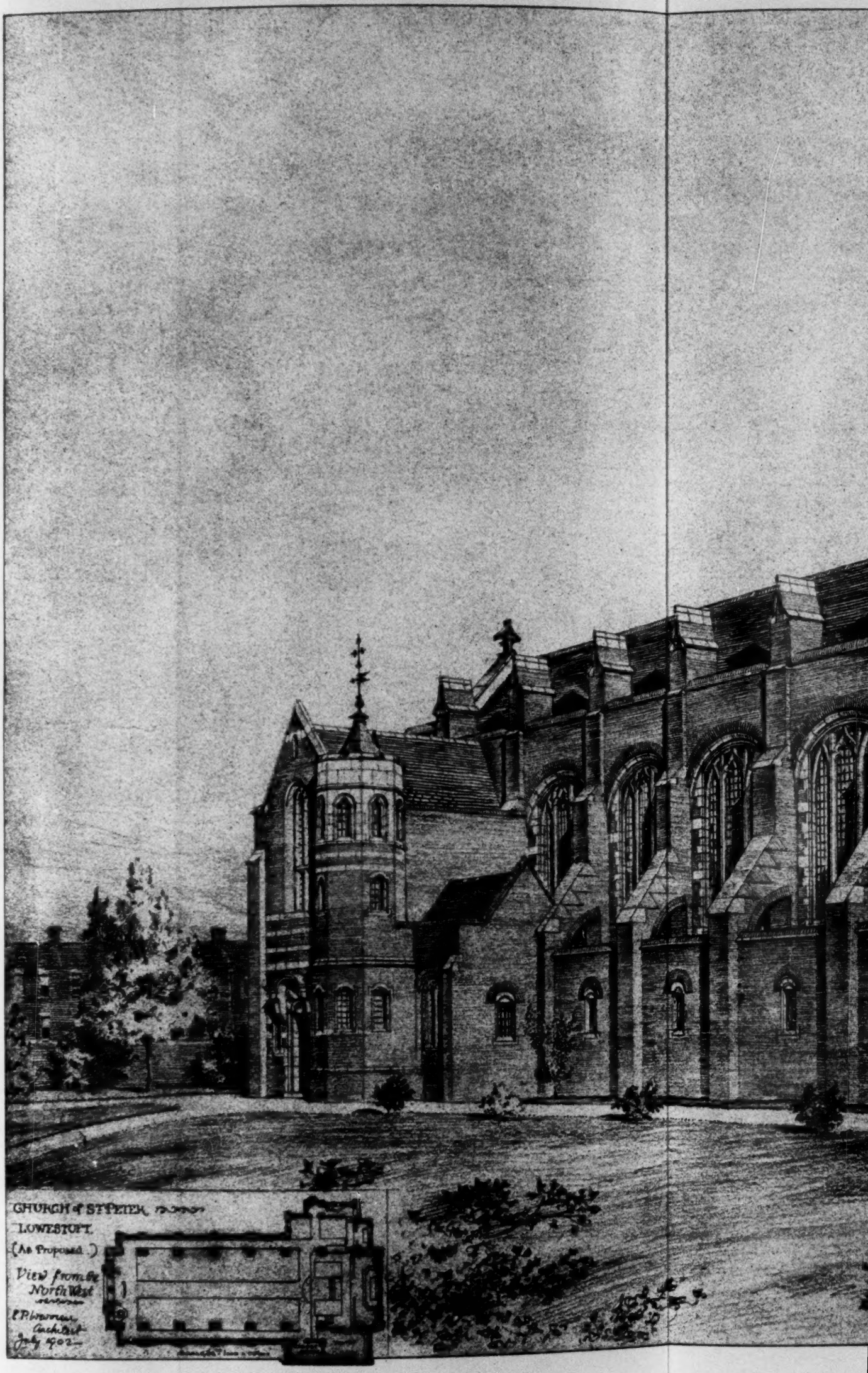
RVEYORS' INSTITUTION.

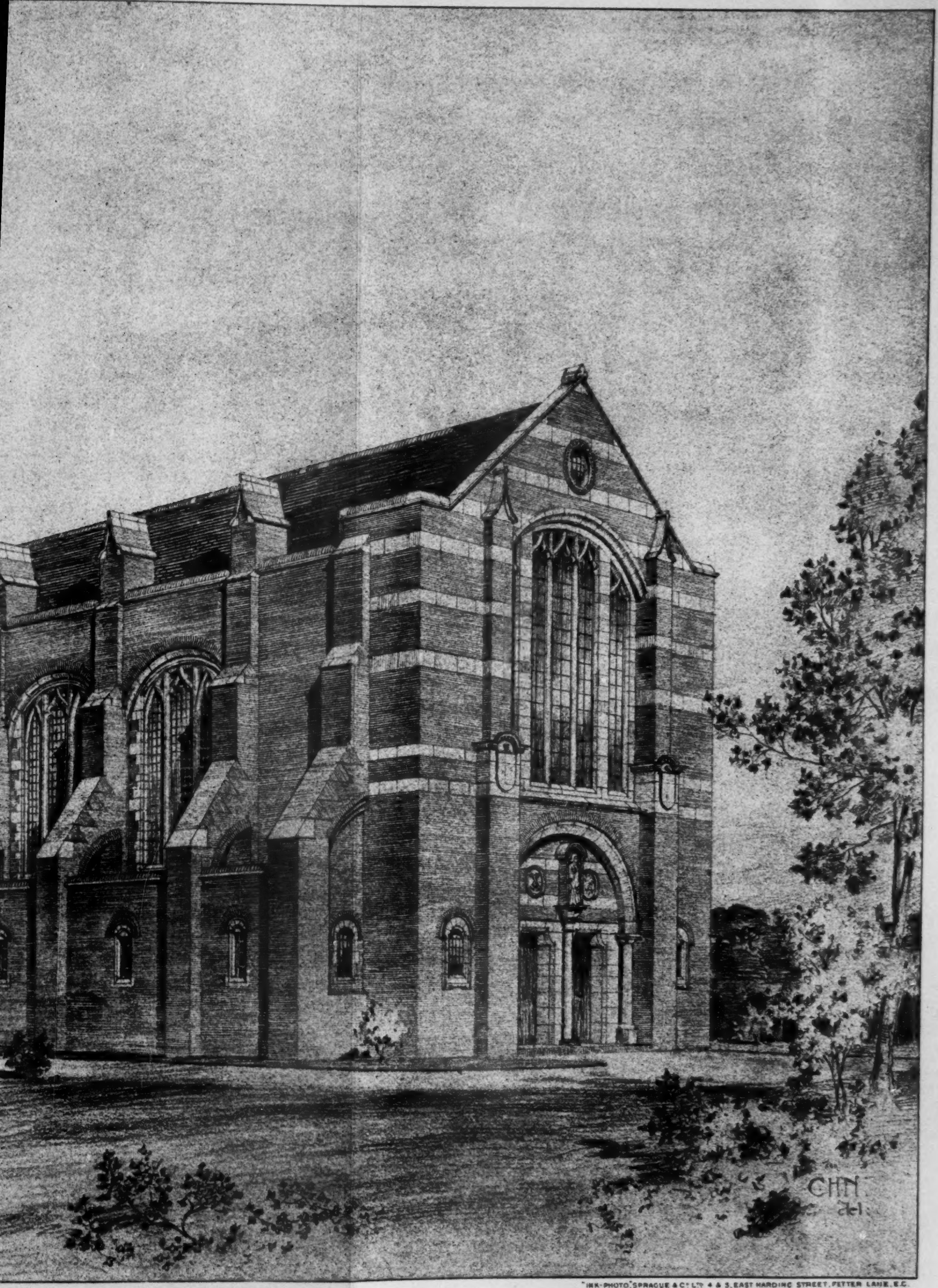
SERVATION OF TIMBER.

general meeting of the Survey-
n was held on Monday after-
12, Great George-street, West-
A. Buck, President, in the chair.
Penfold, Hon. Secretary, having
onations to the Library and
, and a vote of thanks having
to the donors on the motion of

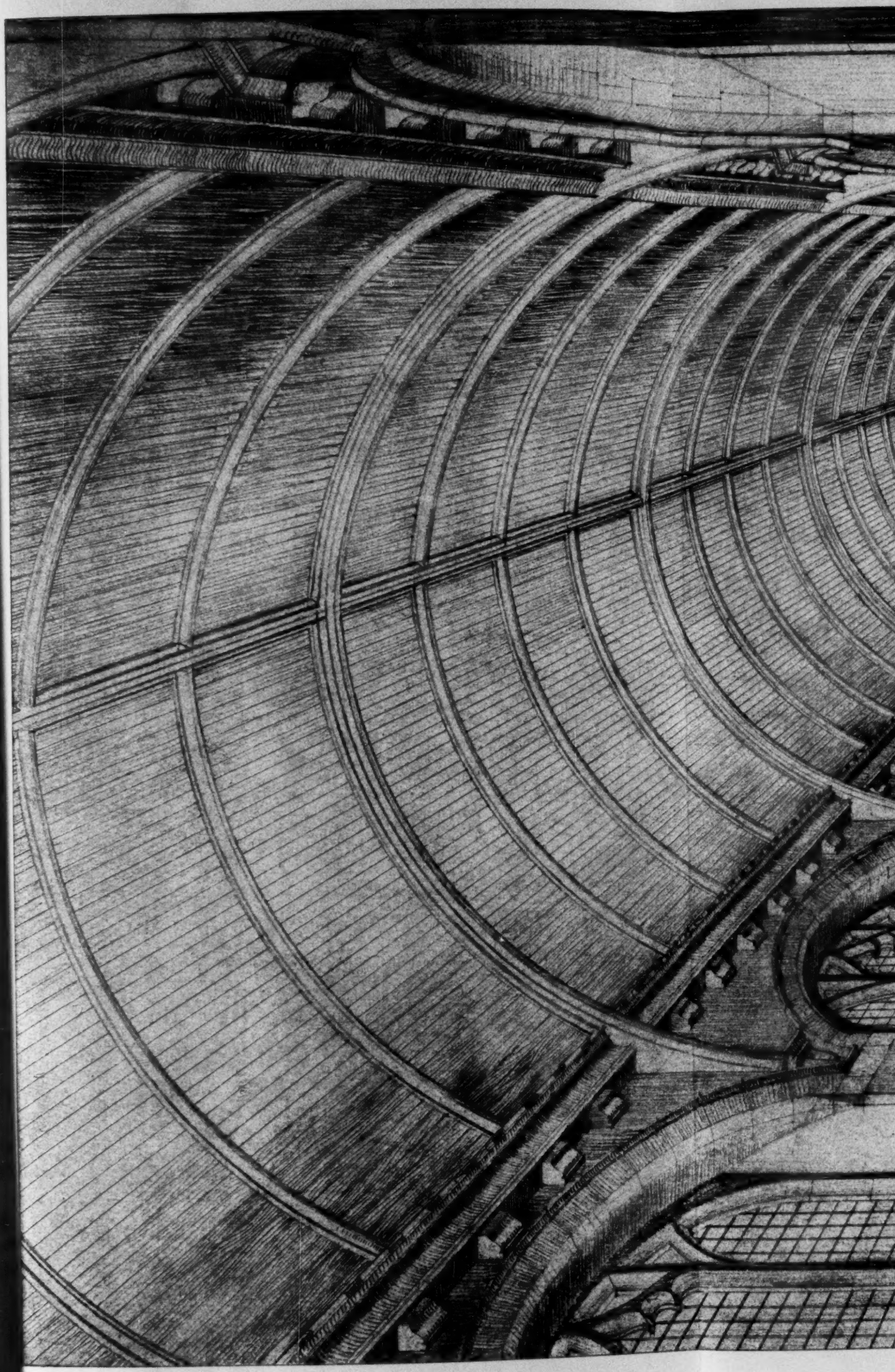
Scammell, F.R.G.S., read a
"The Preservation of Timber,
Reference to its Protection from
the Increase of its Usefulness
Fencing and other Purposes."
ed to some samples of treated
he had placed on view for inspec-
mportance of the preservation of
United Kingdom, and to the fact
y of timber is rapidly decreasing
the world, he said that the whole-
on of the forests of the old world
or the legitimate purposes of land
griculture, and trade, and the
ods often employed in the supply
, to say nothing of the enormous
t destroyed by fire, had brought
easurable distance of a timber
mentioned this in order to bring
ce the necessity, not so much of
d developing the forest resources
and thus repairing the waste of
sent years, as of adopting such
ence brought within our reach
the timber itself. If it is possible,
, to render timber less subject to
nsequently more durable, and to
more fit for industrial uses, by
reservation, then no effort should
d to secure this important result.
n of considerable weight, which
ement to such effort, lay in the
ssed by Dr. Von Schrenk in his
easoning of Timber," issued by
tates Department of Agriculture,
standing timber of varieties now
constructive purposes, owing to
ay, may be made commercially
preservative processes." The
eeding, said he wished it to be
stood that he did not propose to
echnical discussion of the merits
s processes of which he would
esired rather, from the informa-
gained, to lay before them some

of decay in wood were mainly
ia, insects, and worms. Fungi,
rms, were parasites of the living
n so affect it as to render it use-
trial purposes. But they also act
decay, in the same or other forms,
ter it has been felled. The most
the fungi that affect converted
the merulius lachrymans, which
disease so well known and so
d, dry-rot. "The spores of this
Professor Boulger in his book on
02), "germinate on damp wood,
e alkali is present, such as the
nes in stables. Then under the
warm still air (in the absence of





"INK-PHOTO" SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.



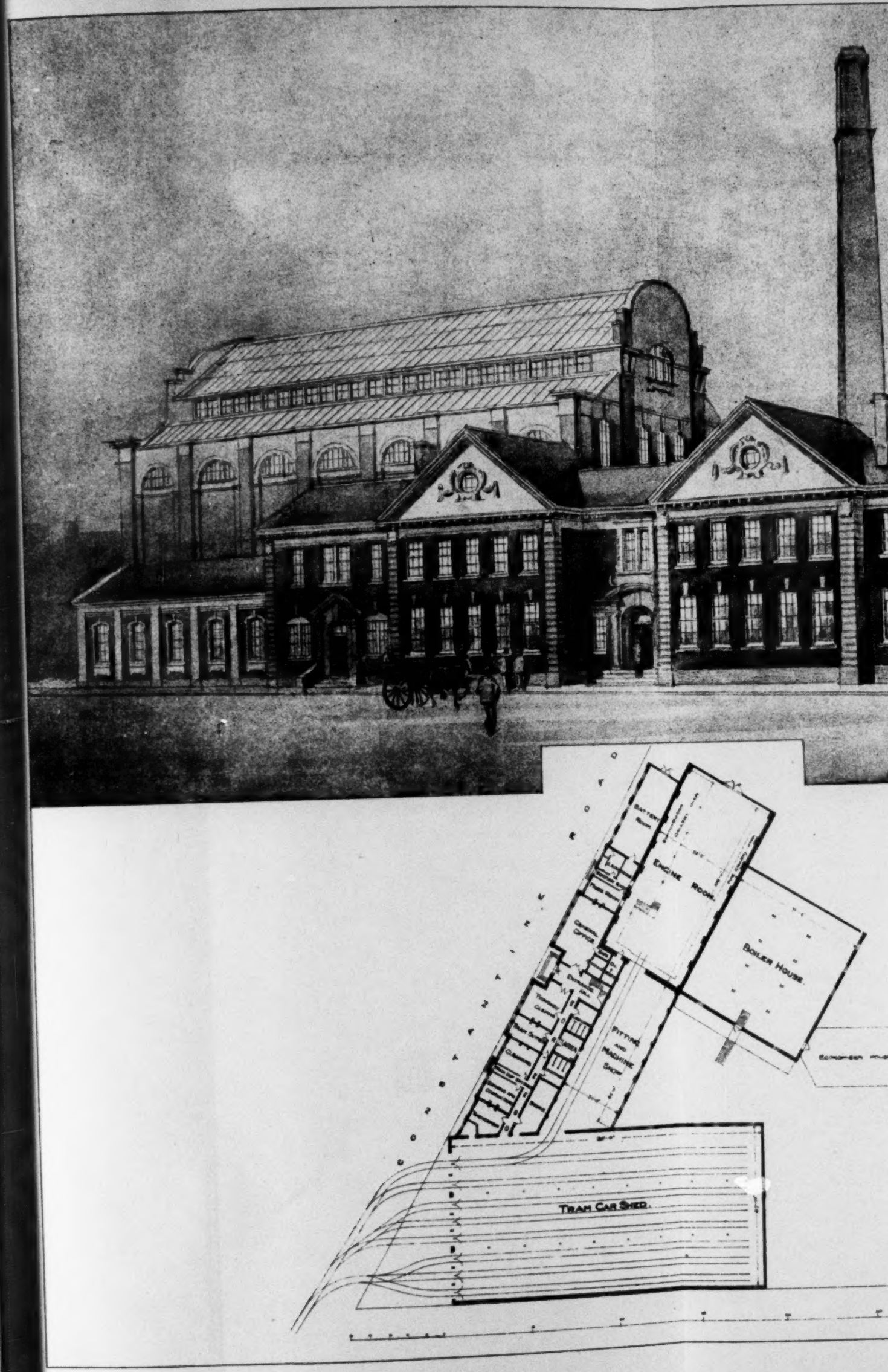
"INK-PHOTO" SPRAGUE & Co LTD 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

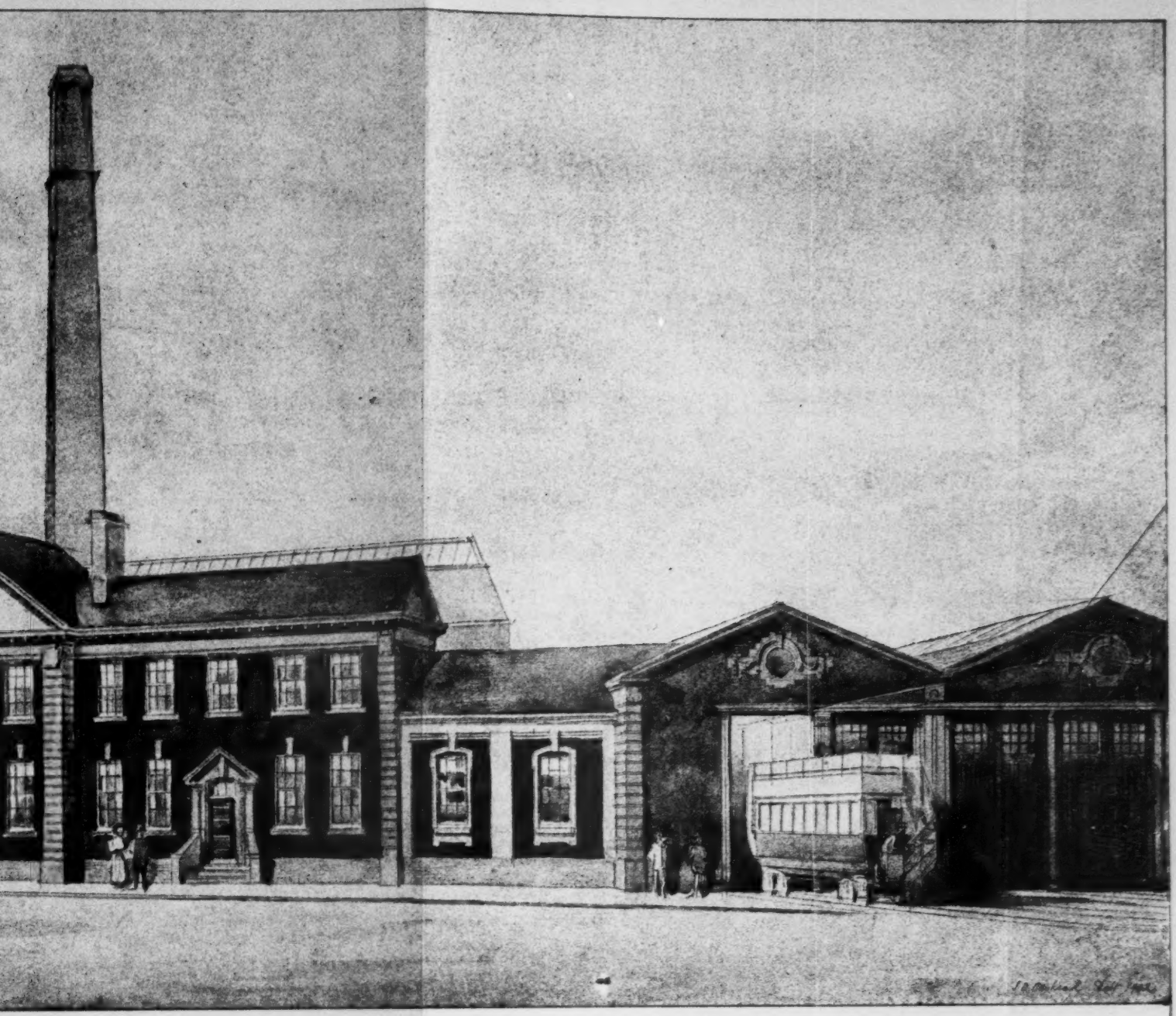
ST. PETER'S CHURCH, LOWESTOFT: INTERIOR.—Mr E. P Warren, Architect.

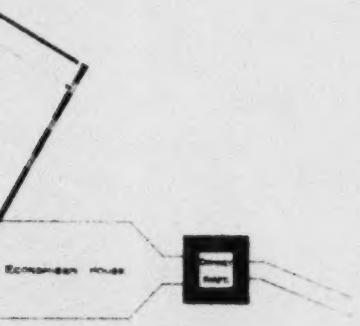
"BUCKLAND," BRECKNOCKSHI

INK PHOTO SPRAGUE & CO LTD 4 & 5 EAST HARDING STREET FETTER LANE E.C.

NOCKSHIRE.—THE LATE MR. S. W. WILLIAMS, ARCHITECT.


Engine Room
Boiler House
Fitting and Machine Shop
Tram Car Shed





FEET

ELECTRIC GENERATING STATION AND OFFICES FOR THE CORPORATION OF IPSWICH.

MESSRS C. STANLEY PEACH AND C. H REILLY, JOINT ARCHITECTS.

MESSRS. KENNEDY & JENKIN, ENGINEERS.

INK PHOTO SPRAGUE & C° LT° 4 & 5 EAST HARDING STREET FETTER LANE E.C.

ventilation) its spawn threads spread not only in all directions through the wood, forming greyish-white cords and flat cake-like masses of felt on its surface, but even over surfaces of damp soil or brick-work and thus to other previously uninfected timbers. Imperfectly seasoned timber is most susceptible to dry rot; the fungus can be spread either by its spawn or by spores, and these latter can be carried even by the clothes or saws of workmen, and are, of course, only too likely to reach sound wood if diseased timber is left about near it; but on the other hand, dry timber kept dry is proof against dry rot, and exposure to really dry air is fatal to the fungus. If only the ends of properly seasoned beams which are inserted in brick walls are previously creosoted, it will prove a most effective protection."

Bacteria, which were also low forms of plant life, were very similar in their action to fungi. But their exact nature and modes of operation it was very difficult to determine. "It is known," says Dr. Von Schrenk, "that fungi and bacteria, which grow on dead or living organic matter, obtain their food by breaking up the complex chemical compounds of which the wood is composed into smaller substances. But there are many questions connected with their life history of which we know practically nothing."

It was well to notice that among the chief contributing aids to the growth of fungi and bacteria were heat and moisture; in fact without these, in due measure, it would be impossible for destructive agents to grow, however abundant might be their food supply. Excess of cold, therefore, or excess of heat, producing complete dryness, were alike inimical to their growth. The same might be said of excess of moisture. Immersion in water, as was well known, would preserve timber from decay for unknown periods. But in considering the question of wood preservation it was certainly important to remember that "no water means no rot." Among the food supplies of fungi and bacteria, nitrogenous substances, such as the sap in the younger portion of the wood, play an important part. It was, therefore, necessary that in any system of wood preservation these should be removed or rendered, if it be possible to do so, chemically inert.

As to the decay caused by insects and worms, it might be said that these agents of destruction consist mainly of three kinds: (1) Moths, the larvæ of some of which were most destructive to growing trees and sometimes attacked converted timbers; (2) termites, better known as white ants; and (3) ship worms or teredos.

The ordinary methods of preservation were by seasoning, either natural or artificial, charring or scorching, and impregnation. As to seasoning, wood, when thoroughly dry, is practically indestructible. In the British Museum could be seen a sample of Egyptian wood that must be, at least, 3,000 years old, while wood had been discovered in the cave dwellings, the age of which it was impossible to estimate. Pieces of pine had been unearthed in Illinois which had been buried 60 or more feet deep for many centuries. In this country there are numberless instances of wood used in buildings which had remained sound and good for hundreds of years. It could be well said, therefore, that dry wood might resist the attacks of destroying agencies for indefinite periods of time. So that, were it possible to season timber, so as to reduce it to a skeleton of lignin, there would be little, if any, need for other treatment. The process of complete seasoning, however, by so-called natural means, involved so many difficulties and occupied such a length of time, that for ordinary industrial uses it was necessary to seek the aid of so-called artificial means. He spoke of "so-called" natural and artificial seasoning because he wanted to make it clear that the difference between the two methods was only, or chiefly, one of name. He should rather describe them as "time seasoning" or "accelerated seasoning," for each method might be strictly "natural," and in complete harmony with the nature of the wood itself. Seasoning could be accelerated by immersion in water. Many of the constituents of wood, which required to be got rid of or changed before the timber could be seasoned, were "leached out" in water, so that timber that had been soaked in water might on exposure to the air be much more rapidly dried. Hence the custom of rafting timber down rivers was recommended, not only as a cheap means of transit, but as a help to seasoning. It would be impossible, however, to adopt this process to any large extent, even were it found to be uniformly advantageous to the wood.

Among the conditions necessary to the success of natural or time seasoning, that was, seasoning by air drying alone, were: (1) the sizing of the timber; (2) its careful stacking so as to secure the free passage of air; and (3) the necessary shelter from the rain or sun. These were matters that were often neglected, and which required increased attention on the part of timber users. But with all the care and skill that might be exercised, the results were often so unsatisfactory, and the cost of thorough seasoning so heavy as to require the employment of other methods. Some timber users strongly object to any other process than that of air-drying, as they consider that timber, though it might be dried quickly by artificial or accelerated means, was often deteriorated in the process, and that the waste involved by splitting might entail in the end greater cost than the slower but surer process. In recent investigations on this subject by the United States Agricultural Department—Bureau of Forestry—whose efforts might well be copied by our own Board of Agriculture, it had been found that careful methods of accelerated seasoning were found to answer well. There were two methods of accelerated seasoning ordinarily employed, viz., kiln drying or hot-air seasoning and steam-drying. In respect to the former, Professor Boulger said, "kiln-drying or hot-air seasoning is suited only to boards or other small material. It is a common practice to first steam the timber, which reduces its hygroscopicity and, therefore, its warping. This, however, is said to reduce the strength, if not also the durability of the wood." Some of the advocates of the steaming process affirm that this did not necessarily follow, as it was possible so to treat the wood that its strength and durability were augmented. But Professor Boulger went on to say: "If not steamed, the ends of boards should be clamped before kiln-drying to prevent splitting and warping. Neither hygroscopicity nor shrinkage of wood can be altogether overcome by drying at temperatures below 200 deg. Fahrenheit; but as a rule only the first shrinking is likely to cause splitting, so that any timber which has had from three to six months air-drying may be safely kiln-dried. Too rapid kiln-drying, however is apt to produce 'case hardening' in oak and other hard woods, the drying and shrinking, that is, of an outside shell followed by 'honeycombing,' or splitting of the interior along the pith-rays."

Dr. Von Schrenk said that "in a number of timber-treating plants in the States green or water-soaked wood is steamed for several hours to prepare it for the injection of chemicals. Steaming is said to coagulate the albuminous substances present in wood, thus rendering the walls of the wood-fibre more permeable." This was the view maintained by the advocates of steaming in this country as a means of accelerating seasoning. But Dr. Von Schrenk considered that until the objection that arises from the risk to the wood, in steaming at high temperatures was overcome, it was at best a "makeshift, and unless modified materially, it can never replace open-air seasoning, supplemented, possibly, by kiln-drying."

Among the processes in operation in this country, the author mentioned the following:—The Chateris-Shapland (improved), the Erith, the Haskinised, Parsons, the Sturtevant, and the Superheated Steam, and he gave a brief description of them. He then briefly referred to charring. It was well-known, he said, that the durability of timber and its immunity for a considerable time from decay, were ensured by charring, which had been practised for unknown periods. The piles on which Venice was built, were charred, and so were ships timbers used in the British Navy long years ago. At the present time it was largely employed in works of piling and fencing, and, on some railways, for oak and other hardwood sleepers. Various processes of torrefying woods had been employed, but to be effective it was necessary that the timber should be thoroughly seasoned before it was charred, if not, it would only hasten its decay. Another objection lay in the fact that the charred surface was liable to easy fracture, and to disintegrate by frost, water, and other influences. At the best, therefore, it could only be regarded as temporary in its action.

The author then dealt with impregnation, or the antiseptic treatment of timber. In seeking to obtain the object sought by any process of impregnation, there were four points, according to Dr. Von Schrenk, to be kept in view:—1st. It must be poisonous to bacterial and other destroying agents. 2nd. It should be capable of easy injection, and when once in the wood it ought to stay there. 3rd. It should penetrate all parts of the wood. 4th. It should be cheap.

One of the ablest works on the subject was that of Mr. S. B. Boulton. The full title of his book was "Antiseptic Treatment of Timber: a Paper read before the Institution of Civil Engineers in 1884, with an Abstract of the Discussion Thereon." Since that time a large number of treatises had been written dealing with various aspects of the question. Mr. Boulton said that "by the year 1838 four several systems of antiseptic treatment were fairly before the public, and competing for the favour of engineers. These were:—Corrosive sublimate, introduced by Mr. J. H. Kyan; sulphate of copper, by Mr. J. J. Lloyd Margary; chloride of zinc, by Sir William Burnett; heavy oil of tar (afterwards called creosote), by Sir John Bethell." The author then quoted Mr. Boulton's description of these systems, and subsequently gave further details of the systems of Burnettising and Creosotising.

Besides these methods of treating wood, there were many others which in recent years had come into use. Some of these were not really methods of impregnation, as they rely upon the solution sinking into the wood by the simple method of painting the wood with the solution or by dipping the wood into it. Among these were the following processes:—Carbolineum avenarius (Messrs. Peters, Bartsch, and Company, of Derby). Solignum (Messrs. Major and Company, Limited, of Hull). Jodelite (Mr. Joseph Dee, of Manchester). The Atlas Wood Preserver and Disinfectant (The Atlas Preservative Co., Deptford, S.E.). Silvertown Special Wood Preservative (Burt, Boulton, and Haywood); and Stop-rot (Messrs. Pilchers, Ltd., London).

The concluding processes which he noticed were true impregnation processes. They were the Hasselman or Xylosote Process (Xylosote Company, London); The Electric Timber Seasoning and Preservation Company, Ltd., London; The Non-flammable Wood Company, Ltd., of Fulham, S.W.; and the Powell Process (The Powell Wood Process Syndicate, Ltd., London).

Mr. T. A. Dickson proposed a vote of thanks to the lecturer for his paper, and said that on estates where posts and fences were largely used the subject was of great importance. As to creosoting, he had found that the results were not as good as could be desired. Carbolineum had given him very satisfactory results.

Mr. Arthur Harston seconded the vote of thanks, and said that the paper would be a valuable one for reference. As to sap, it was often supposed that if the wood was dry the sap had gone, but, of course, the sap wood remained, and that was what was so readily attacked if exposed to either moisture or heat alternately. The important point was not only to endeavour to preserve wood, but to use it free of sapwood. Sapwood, until it turned blue, was, in the view of the timber merchant and builder, good sapwood, because fungi had not attacked it, but as soon as it was exposed to heat and damp it was liable to an attack. His firm had had to erect some miles of oak fencing, and they had found great difficulty in getting oak posts free from sapwood, and they had consequently adopted a system of cast-iron posts, and judging from the number of inquiries they had had other people had adopted the same system. As to wood for joinery purposes, perfectly dry wood should not be made use of in a damp building, as swelling of the wood was the result. As to the sugar process, no doubt if the sugar could be got into the pores of the wood the wood would be stiffened, but he should think it would set up a fermentation which would induce some growth which would destroy the wood. Fungi and the various organisms which attacked wood attacked more readily those with sweet sap. They did not attack so readily oak and teak, because the sap was bitter. To impregnate wood with sugar would, he should think, assist such attacks. In London a great deal of creosoted yellow deal had been laid down as wood blocks, and that had been an oppor-

tunity in some cases for destroying all evidence of sap. As a result, the better informed surveyors to Councils bought their deal blocks uncreosoted, had them sorted, and the sappy wood thrown out, and then had the remainder creosoted. Preservative processes were expensive, and in reckoning the value of a process it must always be considered that in doubling the life they did not double the value of the wood. That was to say, the reversionary life of the wood due to the process must be discounted in present money. They paid their money down at once, and got their value after the natural life of the wood.

Mr. W. T. Ingram said the question was one of cost. What could be done to preserve the poorer and cheaper woods, and what was the cheapest and best method of doing so.

Mr. E. J. Elwes said he was disappointed that the paper did not contain more definite knowledge. What was wanted was more complete and exact knowledge on the subject of wood and its preservation. Our ancestors used tar as a preservative, and he knew of no better substance when properly used. If they could convert such woods as Scotch fir or spruce, which were now practically valueless except for inferior work—if they could, by some process, give them a life four or five times longer than they possessed at present—the value of those woods would be very greatly increased. As to wood for building, he had lived for years in a part of the country where timber was the natural building material, and if the ridiculous restrictions which had been adopted by the authorities could be abandoned he should have no hesitation in using properly-seasoned Scotch fir for keepers' houses and for buildings which were not wanted to last for more than two or three generations.

Mr. A. L. Howard referred to the practice of placing carefully-seasoned wood in buildings not fit to receive it, and to the possibility of destroying the natural life of timber by chemical processes.

Professor G. S. Boulger said the dangerous position for most woods was between wind and water, but as long as they were under water or perfectly dry they kept sound. Mr. Scammell and others spoke as though wood, once dry and seasoned, would last for ever. So it would if it was kept thoroughly dry. The British Museum example was nearer 4,000 than 3,000 years old, and if it was put half under ground in this country it would decay very soon. Although it was true that fungi attacked sapwood, it did not attack that only; it spread from one part to the other. The thing to do was to get rid of the food of the fungi, and that was the sap, and that was to be done by cutting off the sap or by some process or treatment. But more knowledge was required as to what happened in these processes. They heard of chemical compounds of iron and zinc with celluloids, but there was no such thing known. It was not known exactly why timber rots, but they did know that where it was sunk in the ground, there were, especially near the surface where there was plenty of moisture, conditions which set up decay. We needed to know more about soil bacteria. Wood, when seasoned, was vulnerable when placed in unfavourable conditions. Well-dried joists, exposed to damp, would be likely to decay, but where there was good ventilation it was different. As to the new process of impregnating wood with sugar, he was sceptical at first as to the claims made for it, but judging from the tests a great deal had been done by the process. Tar was a good preservative, but it could not be used for wood for use inside buildings.

Mr. E. R. Gabbett said that in the case of posts, etc., which were creosoted first and then had holes bored in them, wet got in and caused decay because the creosoting did not go right through the wood. The holes should be made first and then the wood should be creosoted.

The vote of thanks having been agreed to, and the President having said a few words, Mr. Scammell briefly replied, and the meeting terminated.

BOOKS RECEIVED

FOURTH REPORT OF THE BOARD OF TRADE ON THE CONCILIATION (TRADE DISPUTES) ACT. (Eyre and Spottiswoode. 6d.)

THE DRAINAGE OF TOWN AND COUNTRY HOUSES. By G. A. T. Middleton, A.R.I.B.A. (B. T. Batsford. 4s. 6d.)

LONDON ON THAMES IN BYGONE DAYS. By G. H. Birch, F.S.A. (Seeley and Co.)

A Postcard from Venice.

FROM VENICE.

SINCE the fall of the Campanile, in Venice, there have been many expressions of opinion as to the artistic, romantic, or constructive value and importance of rebuilding this famous monument. At one time—in common with others—even with the memory of its towering grandeur in one's mind, I venture to think that it might perhaps be better for St. Mark's at least to let it remain only as a memory, the church itself gaining and the piazza not losing by its disappearance, though, of course, the whole city as a group must do so.

Now, however, on revisiting the spot, and with the whole lovely dream made real again by personal observation, I am compelled to express my conviction that the loss is so great, the want of the previous rarity and completeness so much felt, that an aching void is created so acute to those who have ever seen the marvellous group of building, of which this Campanile was the culminating centre, that only reconstruction in some form or another can satisfy.

To my mind St. Mark's is absolutely dwarfed. The front seems naked, and, deprived of the Campanile and Loggia at once, staring in solitude, wanting the dominating feature of which it seemed a part, though dissimilar in style, etc. I cannot but hope that something will be done, though at present I believe there is much anxious thought as to what it should be, and the wooden hoardings at present only conceal the flat platform of the old foundations, with rows of new piles outside. These can be seen from the galleries and loggia of the Ducal Palace, as well as much of the old material in the courtyard of the Palace, carefully sorted out into heaps and numbered, some shafts of columns not even broken. The feeling of the inhabitants as to the catastrophe seems too strong for words; only action can express it, shrugs of shoulders and dramatic extension of arms assisting. But, to descend from the sublime to the ridiculous; postcards are printed showing how the indifference, or want of foresight, of the authorities is felt by the public and expressed in ridicule. But, indeed, it is no ridiculous matter, this neglect of warnings and postponement of needed attention and repair until it is too late. One is glad to know that in some instances the lesson is taken to heart, for the Church of the Frari is being saved; others, however, not less in a state of danger, are not at present in hand, though obviously actually dangerous structures. One of these, it is said, will be tied in or banded in such a way that if it fell—as, from the failure of foundations, it would seem likely to do—it must fall in a solid lump, to the destruction of anything in its line of fall, instead of crumbling down in a heap, as did the great Campanile.

Venice, December 3. C. F. HAYWARD.

[*** The accompanying cut is a reduction from one of the recent Venice postcards, enclosed by Mr. Hayward in his letter. The "Garantito senza pericolo" is distinctly humorous.—ED.]

APPOINTMENT OF SANITARY OFFICER.—The Local Government Board has sanctioned the appointment of Mr. G. T. Hill as a sanitary inspector in the City of London from November 12, at a salary of 180*l.* per annum, on the understanding that his duties are strictly those appertaining to the office of sanitary inspector.

ARCHITECTURAL SOCIETIES.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—Mr. Edwin C. Wallis, A.I.E.E., Vice-President of the National Association of Electrical Contractors, read a paper on the 3rd inst. before the members of the Leeds and Yorkshire Architectural Society. His subject was "Electrical Work as Affecting Architects." He called attention to the numerous electrical appliances which now constitute an inherent part of modern buildings, and urged the importance of the work being thoroughly executed. Lightning conductors, he said, ought not to be neglected, for if badly earthed or discontinuous they became fraught with danger. No need existed for the hideous obstructiveness at the tops of some conductors, but there was reason for blending them with the metal finial. Electrical hoists were coming more and more into use. They were marked either with continuous current, single-phase current, or two-phase current, and were quite manageable. In some respects they were superior to hydraulic hoists. The cost of working was less wherever electricity could be obtained at a low figure. Speaking of electrical development, he recalled the fact that twenty years ago there was very little electric lighting in Leeds. The Corporation power-station in Whitehall-road began with 500 h.p., but now there was an installation of 14,000 h.p., and another 4,000 h.p. was on order. Great advance had been made in electrical work and accessories, and the improvement was still going on. The tendency was to use higher pressures. Where formerly 50 volts were used in lighting, 230 volts were now used. A paper dealing with metal casements was afterwards read by Mr. G. Farrar. Mr. Butler Wilson, President of the Society, was in the chair.—*Leeds and Yorkshire Mercury.*

THE ARCHITECTURAL ASSOCIATION OF IRELAND.—The members of this Association recently paid a visit to the engineering works of Mr. William Spence at 107 and 108, Cork-street. They were received by Mr. Spence, his son (Mr. Arthur Spence), and Mr. H. J. Lundy, M.R.I.A.I., his son-in-law, through whom the visit had been arranged. Mr Spence accompanied the visitors through the works, explaining the uses of the various machines, while Mr. Arthur Spence illustrated his remarks by practical demonstration. Having inspected a new row of houses erected by Mr. Spence for his workpeople, and also a large fitting shop which is in course of construction, the members were conducted to the foundry, where the various processes of casting were explained. Several large castings were made in connexion with work Mr. Spence has in hand for Guinness's Brewery. The President (Mr. Charles H. Ashworth) thanked Mr. Spence for his kindness in allowing the Association to view his works, and Mr. Spence replied.

MIDDLESBROUGH BUILDING STATISTICS.—The number of building, draining, and street works in Middlesbrough approved last month was 43, or 11 more than in the corresponding month of last year. The number of houses in course of erection at the end of November was 285, and the number of other buildings and drainage works was 25.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Lines of Frontage and Projections.

Finsbury, East.—A porch at an entrance in South-street to a building on the east side of South-street and north side of South-place, Finsbury (Messrs. Davis and Emanuel for Mr. C. G. Hill).—Consent.

Dulwich.—A one-story building at the rear of Wilson's Grammar School, Peckham-road, Camberwell, to abut upon Dagmar-road (Mr. F. F. Kelly for the Governors of the School).—Consent.

Wandsworth.†—A church on the site of No. 290, Balham High-road (Mr. J. L. Gibson for the Trustees of the Church).—Consent.

Kensington, South.—An addition to No. 133, Westbourne-grove, Kensington, to abut upon Pembridge-villas (Mr. F. W. Hunt for the London and Westminster Bank, Ltd.).—Refused.

Width of Way.

Holborn.—Rebuilding Nos. 14 and 14A, Elm-street, Gray's Inn-road, St. Pancras, abutting also upon Elm-court (Mr. A. Graham for Messrs. W. H. Wagstaff and Sons).—Consent.

Width of Way and Lines of Frontage.

Hampstead.—One-story shops upon part of the forecourts of Nos. 3 and 5, Fairhazel-gardens, Hampstead, to abut also upon Coleridge-gardens (Mr. W. Daniell for Mr. J. Gibb).—Refused.

Brixton.—A building with a one-story addition in front on the site of Nos. 242 to 258 (even numbers only) inclusive, Ferndale-road, Brixton, to abut also upon Stockwell-avenue (Mr. J. W. Chapman for the Bon Marché, Ltd.).—Refused.

Width of Way and Construction.

Wandsworth.—A one-story steel shed at Gothic Wharf, Brewhouse-lane, Putney (Mr. A. E. Chasemore for Mr. W. H. Jay).—Consent.

Space at Rear.

Battersea.—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a dwelling-house at Falcon Wharf, on the west side of Lombard-road, Battersea, with an open space at the rear (Mr. W. J. Dresden for the Council of the Metropolitan Borough of Battersea).—Consent.

Width of Way and Space at Rear.

Battersea.†—Three houses on a site abutting upon the southern and western sides of Ethelburga-street, Battersea (Mr. G. J. Morriss for Mr. W. Taylor).—Consent.

Deviation from Certified Plans.

St. George, Hanover-square.—Deviations from the plans certified by the District Surveyor, under section 43 of the Act, so far as relates to the proposed erection of a building on the site of No. 110, New Bond-street, abutting upon Brook-street, St. George, Hanover-square (Mr. J. D. Young for Mr. D. C. Apperley).—Consent.

Formation of Streets.

Wandsworth.—That an order be issued to Mr. W. C. Poole, sanctioning the formation or laying out of new streets for carriage traffic on the Furzedown Park estate, Mitcham-lane, Tooting (for Messrs. Swain and Selley).—Consent.

Lewisham.—That an order be issued to Mr. H. Porter, sanctioning the formation or laying out of a new street for carriage traffic to lead from Woolstone-road to Cranston-road, Lewisham (for the Leathersellers' Company).—Consent.

Wandsworth.—That an order be issued to Mr. C. W. Braine refusing to sanction the formation or laying out of a new street for carriage traffic to lead out of the east side of Merton-road, Wandsworth (for the Wandsworth and Putney Gas Light and Coke Co.).—Agreed.

Width of Way and Building for the Supply of Electricity.

St George, Hanover-square.—A motor generator station, with an Italian terrace and garden on the roof of such station, on a site abutting upon Balderton-street, Hart-street, Duke-street, and Brown-street, Mayfair (Mr. C. S. Peach for the Westminster Electric Supply Corporation, Ltd.).—Consent.

Means of Escape at the Top of High Buildings.

City of London.—A deviation from the drawings approved on November 18, 1902, in respect of the means of escape in case of fire, proposed to be provided in pursuance of section 63 of the London Building Act, 1894, on the fifth and sixth stories of a building on the north side of East-street, Finsbury-circus, so far as relates to an alteration in the internal planning of a portion of the fifth story of the building (Mr. G. D. Martin).—Consent.

Marylebone, East.—Means of escape in case of fire proposed to be provided in pursuance of section 63 of the Act, on the fifth (top) story of proposed residential flats on the western side of Portland-terrace, Regent's Park, St. Marylebone, to abut also upon High-street (Mr. F. M. Elgood for Mr. J. A. Michell).—Consent.

Westminster.—Means of escape in case of fire proposed to be provided in pursuance of section 63 of the Act, on the sixth story of Queen Anne's-chambers, Broadway, Tothill-street and New Tothill-street, Westminster (Messrs. Rolfe and Matthews).—Consent.

Westminster.—Deviations from the drawings approved by the Council on July 28, 1902, in respect of the means of escape proposed to be provided in pursuance of section 63 of the Act, on the sixth and seventh stories of Rutland-court, Knightsbridge, so far as relates to an additional doorway, fitted with a self-closing fire-resisting door, being provided, from one of the flats to the internal staircase at the seventh floor level (Mr. D. Joseph).—Agreed.

Dwelling-houses on Low-lying Land.

Kennington.—That the solicitor do prepare a licence under section 122 of the Act to Mr. C. Barker, for the Duchy of Cornwall, for the erection of nine dwelling-houses on low-lying land, situated on the east side of Courtenay-street, Kennington-lane, Lambeth.—Consent.

The recommendations marked † are contrary to the views of the local authorities.

ROYAL COMMISSION ON LONDON TRAFFIC.

THE Royal Commission on London Traffic sat at the Westminster Palace Hotel on Thursday last week, when Mr. Arthur Harrison, Borough Engineer and Surveyor of Southwark, gave evidence. He recommended the removal of costermongers and other obstructions from main roads, and the provision of secondary streets for the relief of traffic. He thought the statutory powers now possessed by the Borough Councils over public highways should not be curtailed, because the local authority are far more conversant with the requirements of local traffic, and were in a better position to control the streets than any other authority.

Replying to the Chairman, witness said considerable improvement could also be obtained if the London Building Act, 1894, were amended so as to provide for the London County Council and the Borough Council working together on questions of improved street lines. At the present time a good deal of property in the South of London had large forecourts, and these forecourts were at times built over. Persons proposing to build over forecourts had to submit plans to the London County Council, and a copy of the plans was sent to the Borough Councils for their observations. The decision, however, remained entirely with the County Council, for the observations of the local authority might be regarded or they might not.

The Chairman: What evil arises?

Witness said the result was that they might get a street which was unimportant at the time spoilt although it might in time become an important street for traffic purposes. If a line was laid down by the local authority beyond which the buildings should not come, a good street might be made; the County Council did not always take the advice of the local authority There was the case of St. George's-road, which ran from the Westminster Bridge-road to the Elephant and Castle, where there were a large number of forecourts. The road varied in width from 92 to 70 ft., and they had a chance of making the street a uniform width. The Southwark Council suggested that there should be a line laid down for building but the County Council passed the plans and allowed the buildings to come forward.

The Chairman: You wish there should be some amendment of the Act by which the Borough Councils could have a more powerful voice in the matter?

Witness: Yes.

Replying to Sir John Dickson Poynder, witness said the Borough Council experienced certain dissatisfaction at the attitude of the London County Council. The decision did not narrow the road but it prevented it being widened. He believed there was some question of a consent given twenty years previously by the Metropolitan Board of works which came into this case.

The Chairman: As a rule you find the County Council very anxious to widen the street?—Yes.

Continuing, witness said there were other cases in which the local authority's observations were ignored by the London County Council.

Mr. R. M. Prescott, Town Clerk of Fulham, thought the local authorities should have the power of regulating heavy traffic in the streets, such as heavy carriages carrying timber.

Mr. N. Scorgie, Borough Engineer and Surveyor of Hackney, referred to the obstruction caused by the frequent breaking up of the streets by the water and gas companies, and thought the local authority ought to have power of controlling the time of such operations. He objected to the power of veto on tramway schemes being taken from the local authorities. He dwelt on the crowding of the population in the Hackney district, and supported the proposal of the North-East suburban tube railway to open up Waltham and Chequers Green for the working classes.

At a sitting of the Royal Commission on Friday last week Mr. Councillor Levy, of Hammersmith, gave evidence, and referred to the great congestion in Hammersmith, due to the improved facilities provided by the Central London Railway and the electric tramways. He suggested that King-street should be widened to at least 60 feet. Hammersmith Broadway also required to be widened. He suggested that the embankment of the River Thames, along the Hammersmith foreshore and the construction of a good carriage road would afford great relief to the King-street traffic, and would effect a most important and desirable public improvement. Several years ago the late vestry of Hammersmith prepared a plan of the proposal, and asked the London County Council to carry it out, offering at the same time to contribute a substantial sum towards the cost. The total cost of the improvement however appeared to the County Council to be prohibitive, and they declined to undertake it, but it was felt that the proposal should be carried into effect in the near future.

Replying to the Chairman, witness said the estimated cost of the embankment was 200,000*l.* The local authority offered to contribute 20,000*l.*

Mr. J. Patten Barber, Borough Engineer of Islington, said no doubt much of the delay and danger now caused in thoroughfares crowded with traffic would be prevented by proper widenings and improvements which would provide a greater area for the traffic.

Correspondence.

BRIGHTON AND HOVE HOSPITAL FOR WOMEN COMPETITION.

SIR,—Last week's issue of the *Builder* contains a review of the four sets of drawings which were premiated in the above-named competition. The criticism of my design, No. 46, ends with these words:—

> "But we must add that the omission of the proper staff accommodation asked for ought to have debarred it from consideration by the assessor."

In comparing the schedule in the instructions, and a list of the bedroom accommodation subsequently issued on a printed postcard, with photographs of the actual drawings now hung at Brighton, I find that all that was asked for is provided, and also three small rooms in excess of the Committee's requirements. I have checked the accommodation other than for staff, and cannot find that anything has been omitted or that the conditions and instructions have been departed from in other ways.

In digesting the notes as to accommodation required, it is to be regretted that your reporter did not pay equal attention to the conditions which preceded them. To take one condition only, had he done so, he would have seen that particular stress was laid upon the necessity of making the buildings as light and airy as possible, and that northern lights were to be avoided except in certain specially mentioned cases. In the first premiated design this condition has been completely ignored, as the principal unimpeded light to both the main wards is derived from the north. Even in the longest days of summer, owing to the deep projections, the sun could never reach these windows, and consequently half the beds would be sunless, apart from its being a breach of the conditions, which seems to have been a cardinal point in your reporter's opinion; it is astonishing that the neglect of such an elementary principle in hospital planning should have escaped the notice, not only of him, but of the assessor.

The last paragraph is not written with the object of criticising the design which, in the assessor's opinion, merits the first place, but to show, by comparison with the previous one, that the review is not quite even in its treatment. In justice to me, therefore, I hope you will be good enough to publish this letter in your next issue.

E. P. HOWARD.

*** We could not deal with our correspondent's remarks about his own design without seeing the drawings again, which is not possible at present; but our recollection is that he had omitted the dining-room and sitting-room for the medical staff (as distinguished from the nursing staff). His remarks about the lighting in the selected

design are rather exaggerated, though we pointed out that the south light was somewhat impeded by projections.—ED.

SIR,—Can you spare me a little space? On principle, I always try to agree with the assessor's award, but this one seems really too impossible.

The selected design has nurses' rooms in the roof, servants' in the basement, and free access of air and sunshine hindered nearly everywhere.

The main ward (containing more than half the beds asked for) has its axis east and west, and one only gets direct south sun about two or three months in the year—in summer a verandah roof and in winter the roof of the out-patients' block keeps it off. A part of it will get sun for about an hour or so each day about 10 a.m. and 2.30 p.m. The maternity wards in the corresponding wing suffer in the same way. Projections are so arranged that they impede the air circulation as greatly as they hinder the sunshine. Surely the wards should have had their axes north and south (approximately), so as to get sunshine on each wall in turn. The site was admirably adapted for such an arrangement. I imagine the point never occurred to Mr. Hine, for of the four premiated the first is east and west and the second north and south, and the two for third place one each way.

Then as to the bedrooms for staff, etc. Some thirty-four were called for, and the conditions (and one would think common sense) required that they should have some sun. No 44 places over one-half of them facing north, or in a basement where the sun cannot enter. About thirty of them are entirely in the roof or basement.

Ward bathrooms are about 6 ft. or 7 ft. square, with the bath close against one wall. Are the patients expected to attend to themselves here?

The kitchen is nearly as large as one in an infirmary plan I have before me, where it does all the work for twenty-five times as many patients.

A good point is putting the out-patients' department on the street level; but to do this it is carried on stilts 12 ft. to 15 ft. high, and the space under labelled "Covered Drying-ground." The effect of the raising is not only to add to the cost, but to block out the light and air in the way already described.

With regard to the promoters. Some competitors had more information supplied to them than others by means of a sheet of questions and answers. These modified some designs, I know, and would have modified mine had I seen them.

Finally, as to the exhibition of all the drawings. You fear they had no funds. The profession appears to have provided sufficient. The hospital secretary told a competitor friend of mine that they had 100 to 120 applications for particulars (and presumably nearly as many guineas) yet only 62 sent in drawings. There was no offer in the conditions to return money to those who did not send in drawings, and those I have spoken to on the subject have not yet received, and do not expect to receive anything; so from this source alone there should be 40 or 50 guineas for hire of hall, etc.

HORACE B. APPELBEE.

THE MONTAGUE FORDHAM GALLERY.

SIR,—My attention has been called to the notice in your issue of the 21st ult. of an exhibition of metal work at No. 9, Maddox-street.

As my name is mentioned in that notice, perhaps you will allow me, through the medium of your paper, to give publicity to the fact that I have no connexion with the Montague Fordham Gallery, and no responsibility whatever for the exhibition referred to. I am working entirely on my own account and in my own workshops, and the directors of the Gallery have no authority to take orders on my account, neither am I prepared to execute any orders so taken.

NELSON DAWSON.

Swan House, Chiswick Mall, W.

OWENS COLLEGE AND VICTORIA UNIVERSITY.—A Bill will be introduced in the course of next Session to provide for the cesser of Owens College, Manchester, for the merging of the College in the Victoria University of Manchester, with transfer to that University of all property, real and personal, gifts, bequests, rights, and privileges belonging to the College, and for the retention of the name or style of "The Owens College" for all buildings in Manchester which at the time of the passing of the intended Act have been erected by, or belong to, the College. In terms of the Bill the Victoria University will be free from the control or jurisdiction of the Charity Commissioners, as well as of the Board of Education under the Charitable Trusts Acts of 1853-1894.

The Student's Column.

CONCRETE-STEEL.—XXIV.

COLUMNS (*continued*).

IT is clear from the preliminary discussion of column design in the last article that by hooping or completely surrounding the concrete by steel considerably higher resistance can be obtained than by simple longitudinal reinforcement. But between these two types of reinforcement many intermediate varieties or combinations are possible. Engineers rarely make use of longitudinal rods alone, and columns are almost always designed on lines generally similar to those adopted in the construction of concrete-steel piles, of which Figs. 41-44 may be taken as fairly representative examples. The longitudinal rods are tied together by a more or less complex system of transverse rods or wires, and, in addition to keeping the vertical reinforcement in position, these transverse ties are of some assistance in preventing premature flexure, and in retarding the lateral swelling or bulging of the concrete. The value of the transverse reinforcement varies with its spacing measured along the axis of the column, and if placed too far apart the value must be small.

It has been generally acknowledged hitherto that test specimens of stone, concrete, and similar materials, subjected to direct compression, always fail by shearing along planes inclined to the direction of the stress. Recent investigations conducted in Germany by M. Foeppel, and in France by M. Mesnager, seem to prove, however, that this particular mode of failure is due to friction between the planes of the test specimens and the plates transmitting pressure. And by the introduction of a greased surface for reducing friction to a sufficient extent, it was found by these experimentalists that failure took place along planes parallel to the direction of the stress. If we accept the accuracy of this result an additional reason is furnished for the comparatively small value of longitudinal reinforcement, for rods placed so as to be parallel to the planes of rupture cannot have much influence in helping the concrete to hold together.

Hence it follows that the only advantage of longitudinal reinforcement in columns probably consists in adding the resistance of the steel to the resistance of the concrete, without any true reinforcing effect. This conclusion is similar to that arrived at from the consideration of Fig. 47 in the last article.

The precise influence of such reinforcing rods is somewhat difficult to define owing to the complicated nature of the stresses. It is known that the shrinkage of concrete when setting in air causes internal stresses of great intensity in concrete-steel. Experiments made in 1902 at L'Ecole des Ponts et Chaussées served to throw valuable light upon the effects resulting from shrinkage in large specimens of concrete-steel in which the concrete was mixed in the proportions of 1 : 3 : 6. In the case of specimens, 6 ft. 6 in. long by 4 in. square, each reinforced by four $\frac{1}{4}$ in. diameter rods near the surface, measurements showed that after three months the shrinkage of the concrete had caused a compressive stress in the steel equal to 6,540 lb. per square inch. Similarly in specimens, 13 ft. long by 8 in. by 16 in., each reinforced by four $\frac{7}{8}$ in. bars about 1.3 in. from the surface, the compressive stress in the steel varied from 10,800 lb. to 14,220 lb. per square inch. No reflection is required to show the extreme importance of internal stresses such as these in the reinforcement of concrete-steel columns.

Internal compressive stress is of less importance in the steel reinforcement of beams, because the bars are generally situated in the tension area, and the effect of loading is first to relieve the compression due to shrinkage of the concrete and second to establish tensile stress, to resist which is the special function of the reinforcement. Hence in beams, the initial stress is an advantage; at any rate so far as the steel is concerned.

But in the case of columns the conditions are quite different, for the compression due to loading is added to the internal compression caused by shrinkage of the concrete. Unless this point is thoroughly recognised by designers, serious undercalculation of strength must inevitably follow.

For example, let us assume a quality of concrete is able to withstand without failure a reduction of length equal to 0.1 per cent. Compression to this extent in a concrete-steel specimen will be sufficient to account for a stress in the reinforcement of 29,000 lb. per square inch if the coefficient of elasticity be 29,000,000 lbs. Taking the intial internal stress at 14,000 lb. per square inch, we have a total compressive stress of 43,000 lb. per square inch, which is perilously near, or even above, the elastic limit of ordinary structural steel. Hence, before failure of the concrete, the reinforcement would be practically stressed up to its elastic limit, beyond which no addition would be permissible in practice.

Of course, the figures here used do not apply to all qualities of material, and the internal stress due to air-hardened concrete may not be so high as 14,000 lb., but the fact remains that very considerable compressive stress exists in concrete-steel, set in air, which should never be overlooked by the designer. As a general rule it may be taken that in concrete-steel columns, reinforced by longitudinal rods alone, or by longitudinal rods and transverse ties placed too far apart to afford adequate resistance to lateral swelling of the concrete, the total resistance to compression is little more than the sum of the resistance offered by the concrete and the steel.

Whether concrete in compression fails along planes inclined to, or parallel with, the direction of the force, it is perfectly clear than transverse reinforcement must be beneficial. The tendency to slide along oblique planes would be resisted by any bars intersecting such planes whether they be parallel or perpendicular to the direction of the force, and rupture along planes parallel to the direction of the force would be most effectively resisted by transverse reinforcement. Reinforcing wires, bars, and plates are generally applied in this way by designers of concrete-steel columns and other members intended to withstand compression, but the question is whether the material is disposed in the most advantageous manner.

Perhaps the best answer to this question may be found in the elaborate investigation undertaken by M. Considére, and to which reference was made in the preceding article. This well-known authority confined his attention at first to reinforcement consisting of circumferential hoops, and netting in which the wires were at right angles and parallel to the sides of the section of the specimens tested. The result was to show that with equal weights of steel the resistance of circumferential reinforcement was more than double the resistance of wire netting. This is only what might be expected, for the wires parallel to the faces of a section could have no effect in resisting lateral thrust caused by bulging of the concrete, and nothing would prevent them from moving outwards simultaneously with the concrete. The wires at right angles to the faces would naturally offer some resistance to swelling of the concrete, but only in proportion to the adhesion between the two materials. After trying various expedients M. Considére decided to confine his attention to reinforcement consisting of hoops and spirals of wire.

Table XXIX. gives the results obtained in 1901 from specimens of cement mortar, 1.6 in. in diameter, reinforced by a binding of fine iron wire and without longitudinal reinforcement. The mortar was mixed in the proportions of 675 lb. of cement per cubic yard of sand, with the exception of one prism,

Table XXIX.—Properties of Hooped Cement Mortar (Considére.).

Cement per cu. yd. of sand, lb.	675	675	675	675	730
Age of mortar, days	8	14	22	23	100
Percentage of reinforcement	2	3	4	2	3·4
Crushing strength of total section, lb. per sq. in.	4 870	6,540	7,360	4,930	10,500
Crushing strength of mortar only, lb. per sq in	569	711	853	853	2,420
Increased strength due to hooping	4,301	5,829	6,507	4,077	8,080
Calculated resistance of iron as longitudinal reinforcement	1,564	2,346	3,128	1,564	2,658
Ratio of hooped to longitudinal reinforcement ...	2·7	2·5	2·1	2·6	3·0

in which the proportion of cement was 730 lb. per cubic yard. The iron wire was drawn cold and had no definite elastic limit, but the stress of 78,200 lb. per square inch corresponded with what was virtually the yield point.

The compressive strength of the specimen in the last column is very remarkable, and it is instructive to compare the resistance with that of an iron prism of equal weight. The specific gravity of the mortar was 2.4, and as the average specific gravity for iron is 7.65, the ratio of the densities is about 3.2. If we take the compressive strength of ordinary wrought-iron at 44,800 lb. per square inch and divide by 3.2 we have 14,000 lb. as the resistance per square inch for comparison with an equal weight of concrete. But as the average resistance of a riveted iron section is not more than 75 per cent. of a solid section, the compressive resistence of iron-hooped cement mortar comes out at the same value as that of an equal weight of iron. It is true that the strength of the iron wire used in the experiments quoted was higher than 78,200 lb. per square inch; but such resistance is never afforded by structural iron, and any calculations based on this or higher figures would be quite misleading.

Advantageous as hooping is shown to be with regard to crushing resistance, it is less serviceable than longitudinal reinforcement for resisting flexure, and further experiments were made upon specimens provided with both types of reinforcement. With the co-operation of M. Hennebique, of Paris, a number of prisms were formed, of octagonal section 5.9 in. diameter, and of two lengths—1.64 ft. for testing resistance to crushing and 4.25 ft. for studying the elastic and ductile properties of the combination. The proportions of the reinforcement were varied, the concrete consisting of 1,000 lbs. of Portland cement to 45 cubic feet of gravel and 22.5 cubic feet of sand in some specimens, and in others of 2,000 lb. cement to the quantities of gravel and sand before stated.

As fully 1,200 observations were taken, it is impossible to refer to them in detail, but a few remarks on the more important results may be useful. The following notes apply to one set of six specimens:—

No. 1.—Formed of simple concrete, and crushed under a load of 1,050 lb. per square inch.

No. 2.—Reinforced with helicoidal spirals of ¼ in. diam. iron wire, the coils spaced 1.18 in. centres. This failed by crushing under a load of 5,120 lb. per square inch of total section.

No. 3.—Reinforced with helicoidal spirals of 0.17 in. diam. iron wire, spaced 0.59 in. centres. This was not crushed by a pressure of 5,400 lb. per square inch. The testing machine was not suitable for greater pressure.

No. 4.—Same as No. 2, with the addition of eight longitudinal ¼ in. rods inside the spiral coils. This failed as a column under a load of 4,550 lb. per square inch.

No. 5.—Same as No. 3, with the addition of longitudinal rods, as in No. 4. Failed as a column under a load of 4,700 lb. per square inch.

No. 6.—Reinforced with eight longitudinal rods 0.35 in. diam., and circular ties of 0.17 in. diam. wire spaced 3.15 in. centres, this being closer than is usual in ordinary practice. Failure took place at a load of 2,420 lb. per square inch.

The result given by No. 6 is conclusive as to the inferiority of ordinary transverse reinforcement to spiral hooping. Some of the observations made during these tests are very instructive. No. 1, of simple concrete, ruptured suddenly without any premonitory sign, and No. 6 failed almost as suddenly, its breaking load being only about 7 per cent. more than the load causing the first cracks perceptible. The longitudinal rods bent outwards between the transverse ties and the concrete failed by crushing. These results show that simple concrete, and concrete reinforced by longitudinal rods, must be regarded as materials which fail suddenly with little accompanying deformation.

Nos. 2, 3, 4, and 5 behaved very differently. At the commencement of testing they showed, as did Nos. 1 and 6, very little deformation under small pressures, but the end of this elastic condition was not immediately followed by failure. Shortening was seen to increase rapidly, and cracks appeared in the concrete covering the spirals, the cracks growing gradually wider. Approximate measurements indicated that deformations of as much as 3 per cent. of the length took place before failure. From these notes it is clear that hooped concrete is able to sustain without crushing much heavier loads than simple concrete, or concrete reinforced with longitudinal rods and transverse ties, and, further, that it does not fail for some time after cracks have appeared in the outer surface, and considerable deformation has been evidenced. Hence this type of concrete-steel gives ample warning of approaching failure—a most valuable characteristic of any material used in structural work.

For guidance as to the spacing of the spirals, the following observations should be of service. While specimen No. 2 was under test, cracks began to appear under the comparatively small pressure of 1,730 lb. per square inch, a little later the concrete commenced to flake off, and failure ultimately took place between the coils. Failure was due to rupture of the concrete, there being no indication that the metal had reached its elastic limit. Specimen No. 3 showed no cracks until the pressure of 2,480 lb. per square inch had been attained, and flaking occurred much later, while, as recorded above, the prism did not fail under the maximum load imposed. In Nos. 4 and 5 cracks appeared under pressures of 2,900 lb. and 3,360 lb. per square inch, the higher figures being no doubt due to the addition of longitudinal reinforcement.

Considering these facts in connexion with the spacing and other details of the reinforcement, and with observations made during other series of experiments, M. Considére arrived at the conclusion that the most suitable spacing of the coils was from one-seventh to one-tenth of the diameter when auxiliary longitudinal rods were employed.

Numerous and varied experiments have demonstrated the fact that this ratio holds good almost independently of the absolute values of the dimensions.

OBITUARY.

MR. W. F. HEMSOLL.—The death of Mr. William Frederick Hemsoll, architect, took place at his residence, 40, Southbourne-road, Sheffield, on Saturday. He had been an invalid for several years, and unable to attend business since March last. Mr. Hemsoll was a Sheffield man, son of the late Mr. George Hemsoll. He was apprenticed to the profession of architect, surveyor, and valuer, and started on his own account in Figtree-lane when quite a young man. He was for ten years in partnership with Mr. Joseph Smith, and with him designed and superintended the erection of the Reform Club, several chapels and other buildings, and afterwards was associated with Mr. H. L. Paterson in the erection of the Woofindin Convalescent Home and several council schools. His partnership with Mr. Paterson was dissolved twelve months ago when Mr. F. W. Chapman joined him.

GENERAL BUILDING NEWS.

MODEL DWELLINGS FOR THE POOR, BIRMINGHAM.—A promising experiment, says the *Birmingham Post*, in regard to the housing of the working classes in Birmingham was inaugurated by the Lord Mayor on the 28th ult. More than a year ago a number of prominent citizens, who believe that the housing problem can be solved by private enterprise, promoted a company under the title of "Homes (Limited)" for the purpose of providing clean, sanitary, and cheap dwellings for the poor. After some searching a suitable site was secured in the heart of the poverty-stricken district of Deritend. A piece of land abutting on Palmer-street, Little Edward-street, and Little Barr-street was cleared by the demolition of a dilapidated chapel. Plans were prepared by Messrs. Hipkiss and Stephens, and two blocks of flats, four stories high, have been erected by Messrs. T. Elvins and Sons, of Handsworth. The buildings are divided into 60 tenements, 28 of which consist of one room each, to be let at 3s. per week; 16 of two rooms each, at 4s. 3d.; and 16 of three rooms each, at 5s. On every floor is a wash-house containing two boilers. There is a ventilated cupboard for food, and water is laid on to a sink in each tenement. The ends of the corridors are open to the air, and through these big openings coal and bulky furniture can be hauled by means of pulleys fixed in a convenient position. Fire escapes can be attached to each tenant's balcony in case of panic. Gaslight is provided in the corridors and staircases; whether gas or oil is used in the rooms is left to the discretion of the tenants.

NEW SCHOOL, HANWELL.—A school to accommodate 1,140 scholars is to be erected by the Middlesex County Education Authority at Oaklands-road, Hanwell. The plans have been prepared by Mr. William Pywell. The buildings are to consist of a two-story school for boys and girls and a single story building for infants, a caretaker's cottage, and the usual covered play sheds and sanitary blocks. The boys' and girls' school will have an assembly hall for each department. The classrooms are grouped round the halls. The infants' school will have a wide corrider for exercise, from which the classrooms will be entered.

BUILDING TRADE, GLASGOW.—Not for a period of something like twenty-six or twenty-seven years—not since the years immediately preceding the failure of the City Bank—has the local building trade boomed as it has done recently. Following the crash which the stoppage of the bank precipitated, building in the city was almost at a stand-still. During the year 1876-7 the linings granted by the Dean of Guild Court for houses and shops represented a valuation of 1,026,130*l*. The year following, the City Bank year, these figures dropped to 222,320*l*., and in 1880-81 they touched the lowest point in a period extending over thirty years, the valuation being set down at 77,100*l*. It required some time to recover from the staggering blow the bank smash had inflicted, and it was not until 1891-92—the year of the annexation of the south suburban districts—that the building trade got on to its feet again. In that year the court granted 106 linings, valued at 457,750*l*., and since then each year's returns have exceeded those of the twelvemonth before. 1901-02 witnessed the trade reach its high-water mark, the linings granted numbering 197, the valuation of which was 1,458,710*l*., while last year the valuation was estimated at 1,405,589*l*. It may be safely predicted that the figures for the current year will show a decided shrinkage on those just quoted, for builders and others interested in the industry have made up their minds to stay their hands for a while. Two features of interest mark the Guildry returns during the last three decades. Houses of one apartment have decreased in favour with builders, whereas houses of two and three apartments have claimed the major share of attention. Thirty years ago 1,338 one-room houses were erected; last year the total was 765. The year of the bank failure there were 531 two-room houses built; last year 2,117. The figures relating to three-room houses for the same years are 187 and 1,203. All parts of the city, and the suburbs, too, for that matter, have been the scene of the builders' energy and enterprise. Springburn, Dennistoun, Shawlands, Crosshill, Govanhill, Battlefield, Scotstoun, and Renfrew-road have been covered with modern tenements, and the men engaged in the work have been reaping substantial reward of their labours in the shape of continuous employment at maximum rates. But the question arises, has the supply of new houses exceeded the demand?—*Glasgow Evening Citizen*.

THEATRE, MIDDLESBROUGH.—The new Grand Opera House, Middlesbrough, is situated at the corner of Linthorpe and Southfield roads, and has a frontage of 152 ft in Southfield-road and of 100 ft. in Linthorpe-road. The exterior of the building has been carried out with pressed red bricks, with dressings of artificial stone. Messrs. Allison Bros., of Middlesbrough, have carried out the building contract, and the architect was Mr. W. Hope, of Newcastle-on-Tyne.

PRUDHOE CHURCH.—It is intended to remove the Catholic Church now adjoining Prudhoe Hall, Northumberland, and to rebuild it at Prudhoe-on-Tyne. The church is a modern building of stone throughout interior and exterior, complete with sacristies, tower, gallery, baptistry, chapels, and donor's vault, etc. The direction of this work is in the hands of Mr. Charles Walker, architect, Newcastle-on-Tyne.

RESTORATION OF ALL SAINTS' CHURCH, DERBY.—The vicar of All Saints', Derby, at the recent annual social gathering of the congregation, read a report from Mr. Temple Moore, the architect, on the subject of the restoration of the church. As the funds required would be too much to expect the congregation to raise unaided, a county committee was being formed.

BUSINESS PREMISES, BELFAST.—New business premises have been erected in Donegall-place, Belfast. Mr. Vincent Craig is the architect for the work. The building contract was carried out by Messrs. M'Laughlin and Harvey, under the superintendence of the architect, and the fitting up of the shop was executed by Messrs. Curtis and Sons, of Leeds. The other contractors were:—Electric lighting and plumbing, Messrs. Richard Patterson and Son; heating, Messrs. Musgrave and Co., Ltd.; decorative work, Messrs. Morrow and Son; strongroom and safes, Messrs. Chatwood and Co.; granite, etc., Messrs. J. Robinson and Co., Ltd.; stone carving and sculpture, Messrs. Winter and Thompson; glass, Messrs. Clokey and Co.; grates, etc., Messrs. Riddel and Co.

TOWN HALL, CHELTENHAM.—Sir Michael Hicks Beach, Bart., M.P., ex-Chancellor of the Exchequer, has just opened the new Town Hall

which has been erected by the Town Council of Cheltenham. Mr. F. W. Walker, of Gloucester, was the architect, and the chief contract was placed in the hands of Messrs. Collins and Godfrey, of Cheltenham and Tewkesbury. The new Town Hall, in general design, is Classic, freely treated. On the north side of the building is the main entrance, which gives access to the crush hall, the dimensions of which are 40 ft. by 20 ft. The floor of this hall is of marble mosaic, with borders of floral pattern. At either end of the entrance-hall is an octagonal-shaped hall, measuring 24 ft. across; adjoining that on the east side is the ladies' cloakroom, while similar accommodation is provided for gentlemen on the west side, and here also is one of the staircases to the galleries which surround the great hall or entertaining-room. From the octagonal halls the main corridors, 92 ft. in length and 12 ft. wide, run the whole length on either side of the great room. The great hall is designed to fulfil the double purpose of balls and of concerts and public meetings; its dimensions are 112 ft. in length by 82 ft. in width, and 43 ft. in height. At the south end is a proscenium and orchestral platform, 31 ft. across, with organ loft, as yet empty; and at opposite end the front of the gallery is elliptically treated. A feature in the decoration scheme is the scagliola columns, sixteen in number. The balconies, five on either side of the hall, are rounded quadrants with elliptic fronts and turned balustrades. Behind the balconies run the promenades, 12 ft. wide, corresponding to the corridors below. The decorating scheme was modelled by Mr. H. Frith, of Gloucester, and is in the Renaissance style, freely treated. The dancing floor has been constructed throughout of the best maple ($3\frac{1}{2}$ in. by $1\frac{1}{4}$ in.), carried on rolled steel joists with patent springs. It is estimated the hall will seat from 1,200 to 1,500 people. Subsidiary halls are: the large drawing-room, 57 ft. by 27 ft.; the lesser drawing-room, 26 ft. by 16 ft. 6 in.; the cardroom, with lavatory adjoining, 26 ft. by 16 ft. 6 in.; the smoking-room, 20 ft. by 16 ft.; the supper-room, some 55 ft. square; and a room for light refreshments, 37 ft. by 37 ft.; while kitchen accommodation is given beneath.—*Bristol Mercury*.

WESLEYAN CHURCH, AVONMOUTH.—The memorial-stones have just been laid of a new Wesleyan Church at Avonmouth. The new buildings will occupy a corner site, centrally situated on the main road from Bristol. The school is to be built first, and it will serve the purpose of a chapel for the time being. The work is being carried out by Mr. E. Love, from the plans of Messrs. La Trobe and Weston, architects.

CONGREGATIONAL CHURCH, WHITTLESFORD, CAMBRIDGESHIRE.—A new Congregational church has just been opened at Whittlesford. The building has been designed to accommodate 300 adult worshippers, and has an extreme width of 41 ft. 6 in., and an extreme length of 74 ft. 6 in. It is set back a distance of 30 ft. from the roadway, and is so arranged that at any future period a Sunday school building can be added at the rear. There are two main entrance doors in front, leading into a vestibule 4 ft. 6 in. wide, occupying the whole width of the building. This vestibule has a tiled floor, panelled dado, and plastered walls. In the body of the church the seating is arranged in three bays, one in the centre and one on either side, to which access is obtained from two 4 ft. wide aisles. The platform is 15 ft. wide and 10 ft. deep. Behind the church are the vestry, stores, boiler house, etc., with separate entrance doors. The main features externally are the tower with its shingle-covered spire. The materials externally are red sand-faced bricks and hand-made tiles. The design for the church was prepared by Mr. Henry S. Jardine, architect, and Mr. J. Custerson, of Saffron Walden, was the contractor for the work.

BIRMINGHAM UNIVERSITY NEW BUILDINGS.—Within a few weeks, says the *Birmingham Post*, building operations in connexion with the erection of the second and more important section of the Birmingham University new buildings will be entered upon, and within a period of something like nine months, according to the terms of the contract, one portion of the main structure is to be completed. Already the building work is in a more advanced state than is generally known. Messrs. Smith and Pitts, of Balsall Heath, the builders who secured the contract for the erection of the power station, have practically completed this work, and the more extensive work of putting in the foundations, which was let to Mr. Thomas Rowbotham, contractor, Small Heath, will very shortly be finished. The cost of these foundations will be something like 70,000*l*. The work includes the construction of the basements, kitchens, and subways, these rising to a height of 13 ft. 6 in., and the superstructures thereon rise to a further height of 18 ft. 6 in. In fact, at the present time a considerable portion of the building is nearly half completed. The work has been in hand about fifteen months, and for a long time some 500 operatives were employed daily. To accelerate the job, the contractor has now upon the ground a large and up-to-date machine plant, without which the progress made could scarcely have been brought about. The tenders for the further superstructures, internal finishings, and other work will be dealt with by the architects during the present month.

GREENWICH CENTRAL LIBRARY.—On Wednesday the Greenwich Borough Council entered into agreements with Mr. Sydney Smith to prepare working drawings and a specification, and with Messrs. Fowler and Hugman, to take out quantities for the proposed Central Library at Tunnel Avenue. 6,350*l*. is the limit fixed for the cost of the building, excluding the foundations below the footings of the walls.

CATHOLIC SCHOOL, LOCHGELLY, DUNDEE.—The new Roman Catholic School at Lochgelly has just been opened. The building is built of Grange stone, and is situated in Station-road. There are six classrooms to accommodate 310 pupils. The girls' and infants' entrance is at the south end of the building, and the boys' entrance at the north end, both entrances being connected by a corridor, 15 ft. wide, and, having a sound-proof floor, can also be used as a marching-hall. The corridor runs from the one end of the building to the other, connecting the two entrances, and has an open timber roof with continuous roof lights. At each end are teachers' rooms, cloakrooms, and lavatories, these being shut off from the corridors by large double swing glass doors. The dado walls of entrances, cloakrooms, and corridor are lined with white glazed tiles. Four of the classrooms are so divided with glass sliding partitions that they can be converted into a hall. The total cost is about 3,000*l*. The work has been carried out under the personal supervision of the architect, Mr. William Birrell, Kirkcaldy, and the following are the names of the contractors:—Mason work, Andrew Wilson, Cowdenbeath; joiner work, Alexander Smith, Ladybank; plumber work, Alexander Rolland and Co., Dunfermline; slater work, John Lawson, Kirkcaldy; plaster work, John Easton, Kirkcaldy; iron work, Thomas Gibson and Son, Edinburgh; glazier work, John Haxton and Co., Kirkcaldy; painter work, Andrew Alison, Cowdenbeath; tile work, Haddow, Forbes, and Co., Edinburgh; heating, Dilworth and Carr, Preston; sliding partitions, John Stones, Ulverston.

CENTRAL HOTEL AND RESTAURANT, WORCESTER.—The completion of the first section of the High-street improvements, commencing at the Cross, is now an accomplished fact, says the *Worcester Times*, and it is easy to conceive what a splendid acquisition will be secured to the streets of the city when the whole scheme is finished, as no doubt it will be within a few years, making the street 50 ft. wide, or double what it was, in its most congested parts. The removal of the old shops opposite the Bank will be effected within a few months. The new Central Hotel and Restaurant at the corner of the Cross is now completed. Messrs. J. Wood and Sons, of Worcester, were the contractors for the entire structure and fittings. Messrs. Lewis Sheppard and Son, of Worcester, were the architects, and the following firms supplied works and fittings of special features:—Messrs. J. Ward and Son, Worcester, the warming and cooking appliances; Mr. Santonna, of Worcester, the electric lighting; Messrs. Archibald Smith and Stevens, of London, the lifts; Messrs. Minton Hollins and Co., Stoke-upon-Trent, the wall tiling; Messrs. Doulton and Co., the terra-cotta and faience fireplaces. The general foreman representing the contractors was Mr. Charles Pumfrey.

SANITARY AND ENGINEERING NEWS.

PLYMOUTH MAIN DRAINAGE OUTFALL.—Recently, it will be remembered, Pethick Bros., the contractors for the main drainage outfall at Rusty Anchor, which is the subject of litigation between themselves and the Corporation of Plymouth, applied to the Council for permission to make a survey of the outfall works. The Corporation, however, refused the request on the dual ground that Messrs. Pethick were represented above and below water at the survey made some time since by the engineer and divers employed on behalf of the Corporation, and that a further survey now would interfere with the contract which Messrs. Pearson have accepted for the reconstruction of the outfall. Pethick Bros. thereupon issued a summons for leave to inspect, and an injunction to restrain the Corporation from proceeding with the work of reconstruction, until they had had an opportunity of making a survey. The hearing of the application took place in London on the 2nd inst. in Chambers before Mr. Justice Phillimore, and, in the result, the injunction was refused, but an order was made giving Messrs. Pethick liberty to survey, the survey, however, to be made without disturbance of pipes or coverings, and not to delay the work of reconstruction.—*Western Morning News*.

MISCELLANEOUS.

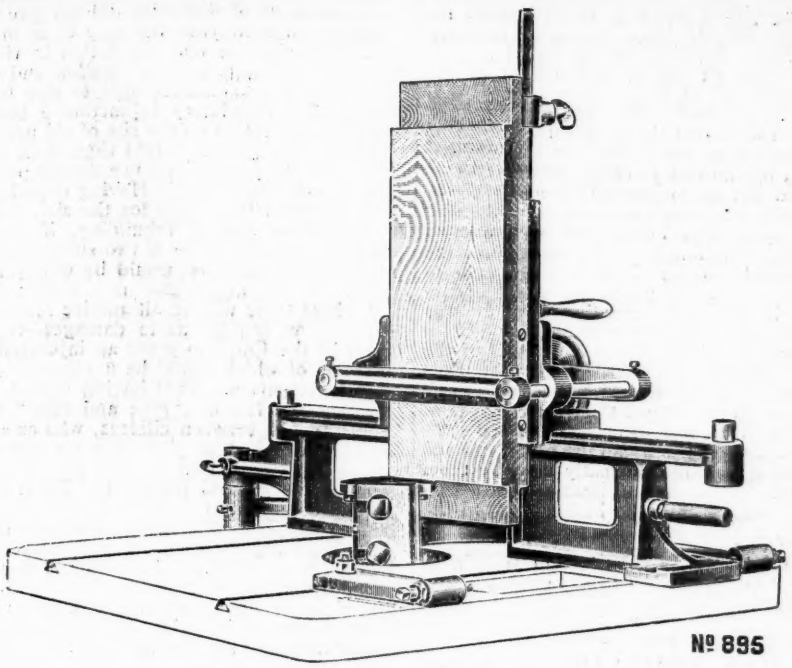
PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—The "B. and S. Folding Gate Co." have gone into so many other branches of manufacture that their original style is now a misnomer, and their business will be conducted in future under the style of "Arthur L. Gibson and Co."

BRICKS IN THE TRANSVAAL.—The Commercial Intelligence Branch of the Board of Trade has received a communication from Mr. C. A. C. Treemer, correspondent of the branch at Johannesburg, forwarding information with regard to the brick trade in the Transvaal. Mr. Treemer expresses the opinion that little or nothing could be done in the way of exporting bricks to that country, as the cost of rail carriage from the coast is a very big item, and, further, there are brickworks in Johannesburg, in some instances keeping their output down to correspond with the demands. The following are the prices quoted at Johannesburg:—Wire-cut bricks, 85*s*. per 1,000; stock bricks, 95*s*. per 1,000; fire-bricks, 10*l*. per 1,000.

AUSTRIAN CEMENT INDUSTRY.—H.M. Consul at Trieste has forwarded a memorandum to the Foreign Office regarding the present situation of the cement industry in Austria. He states that the consumption of Portland cement in that country from January, 1903, to October, 1903, has been somewhat greater than that of the corresponding period of last year. A considerable quantity of cement is at present used for the construction of the new "Tauri" railway, and the manufactories of the Alpine regions of Austria will have for this reason sufficient work for several years. The prices of cement, compared with those of last year, are not higher. On the contrary, the "trust" of Austrian Portland cement manufacturers, it is assured, does not intend to increase the prices of cement even for next year. To the "trust" belong all the twenty manufactories that are providing for the consumption of Austria; besides, conventions exist with fifteen manufactories of the interior of Austria and foreign countries which, within certain limits, stand in relation with the "trust." The Austrian cement export to foreign countries has been of small importance this year, not only because many Austrian manufactories are too far from the sea, but principally because of the excess of production elsewhere.

TOLEDO CATHEDRAL.—The correspondent of the *Standard* has sent the folowing communication to his journal:—"Senor Alcantara, with several other experts in architecture and art, visited Toledo Cathedral last week directly the Madrid papers published alarmist reports about the condition of that fine mediæval structure. Senor Alcantara states that many parts of the Cathedral, especially the tower and several columns, naves, and roofs, need prompt repair, as the authorities have for years pointed out. Only lack of funds prevents both the Public Works Department and the Diocesan authorities from saving the building, which is like many other Cathedrals and churches in Spain in being threatened with ruin."

UNDERGROUND ROOMS IN ST. PANCRAS.—The Public Health Committee of the London County Council reported as follows at Tuesday's meeting of the Council:—"On November 10 last, we reported that we had been in correspondence with the St. Pancras Borough Council on the subject of the large number of underground rooms illegally occupied in that Borough, and we stated that the Borough Council had informed us that they had taken action in certain cases and had served notices on the owners requiring them, within three months from the date of the service of the notice, to discontinue to suffer these rooms to be let or occupied as dwellings contrary to the statute. We have now received a further letter, dated November 30, from the Borough Council, stating that the notices were duly served on August 7 upon the owners and occupiers of fifty underground rooms illegally occupied as dwellings, requiring the discontinuance of their use as sleeping-rooms within three months. The notices expired on November 7, and on November 9 these underground rooms were re-inspected, with the following results:—Total number of notices, 50; rooms empty, 22; rooms occupied in conjunction, 15; premises demolished, 2; number of notices uncomplied with, 11. The Council is no doubt aware that the underground room must be let and occupied 'separate' in order to be illegally occupied. If two rooms in a basement are let and occupied together, one of which is underground within the meaning of the Act and the other is not, then there is no contravention of the law. It will be observed that in fifteen cases, or 30 per cent. of the total number, the occupants have either exchanged one of the underground rooms for a room on another floor, or have taken an additional room or rooms on another floor or floors, or the occupants have left, and the room has been let as an additional room to one of the remaining occupants."



Sagar's Patent Tenoning Apparatus.

PATENT TENONING APPARATUS.—A newly patented appliance for tenoning, to be used in connexion with vertical spindle moulding machines, is shown by the illustration here reproduced. The apparatus, which is manufactured by Messrs. J. Sagar and Co., of Halifax, admits timber up to 11 in. wide by 3 in. thick, and it is claimed that it will make a complete and perfectly accurate tenon, up to the maximum length of $4\frac{3}{4}$ in. The device consists of a bracket oscillating horizontally and carrying a cramp for holding the timber in a vertical position. The cramp is fitted so that, after the timber has been secured it can be slid past the cutter block of the moulding machine, thus making one side of the tenon. The bracket is next swung over, so as to bring the other side of the timber to the face of the cutter, the cramp is pulled forward, and the tenon is then completed. Adjustable stops are provided on the table for regulating the thickness and depth of the shoulders, and by a very simple device the length between the shoulders of tenons can be accurately gauged without measuring or marking off. The complete apparatus is designed so that it can be fitted, without any special preparation, to the vertical spindle moulding and shaping machines made by the same firm.

THE LONDON BUILDING ACT.—On Tuesday, at the meeting of Deptford Borough Council, the Works Committee reported having had under consideration a letter from the London County Council asking for suggestions for the amendment of the London Building Act. The Committee thought that a clause should be inserted as advocated by Kensington Borough Council last year, providing for the transfer of the powers and duties of District Surveyors to the Metropolitan Borough Councils. The Committee further was of opinion that the powers exercised under Section 84, which were transferred by the London Government Act from the London County Council to the Metropolitan Borough Councils, should again revert to the central authority. The section in question deals with the granting of licences for the erection of wooden structures, but the difficulty of exercising this power had been very largely increased owing to a decision in the courts during the present year, in which a person, having already obtained the sanction of a Borough Council, was prosecuted and convicted under another section of the Building Act at the instance of the London County Council. Therefore, the Committee believed that it would materially enhance the efficiency of the administration of this section if the above-mentioned power were exercised by the central authority. The Report was adopted.

ARCHITECTS AND BUILDERS AND ARBITRATION.—A matter of some interest to architects and contractors was discussed at Tuesday's meeting of the Pontypridd District Council. It arose on the Report of the Works Committee, which reported having received a letter from Mr. H. T. Hare, architect of the new public offices, referring to the objection taken by Mr. Watkin Williams, contractor, Cardiff, to a clause in his draft contract—with respect of the right of the architect to have any work opened and to order the removal of improper work—being exempted from arbitration. Mr. Hare recommended that if Mr. Williams declined to sign the contract as drawn the tender of one of two other firms should be accepted. A letter was read from Mr. Watkin Williams suggesting that a local arbitrator be appointed to decide any dispute which might arise between himself and the architect with regard to the matters referred to in the clause. A resolution was moved at a committee meeting to amend the contract so as to provide that any dispute between the two be referred to arbitration by the President of the Royal Institute of British Architects, but this was lost by one vote. A deputation of local builders now waited on the Council, asking the Council to delete the clause.—Mr. Williams (Messrs. Williams and James) stated that the clause, which had been accepted by the Institute of Builders and the Institute of Architects, was to some extent being forced upon South Wales. It suited builders in London and in the North of England, but not in this district. It had not been adopted here, and the question would be considered at the next meeting at Swansea of the South Wales Federation of Builders, who were distinctly opposed to it.—Mr. M. Julian stated that the builders objected to any architect being sole arbitrator and being given full power of control as to the nature of material or workmanship, without the right to appeal. It was a very unfair position to put them in.—A letter was read from Mr. Watkin Williams, who is Vice-President of the South Wales Federation of Builders, stating that during his twenty years' experience he had never had occasion to refer to arbitration, and had not signed a contract which did not contain a fair arbitration clause. The Barry Council had conceded what he was now asking the Pontypridd Council to do, and the contract for the erection of the asylum at Talgarth, at a cost of 120,000*l.*, recently completed, contained an arbitration clause.—Mr. F. G. Edwards moved the deletion of the paragraphs in the committee's report alluding to the clause, which was seconded by Mr. Gronow. The Chairman (Mr. W. Lewis) pointed out that the contractor for the Cardiff offices and the London builders accepted the clause, and the majority of the committee thought they would best serve the interests of the ratepayers by supporting the wishes of the architect. Upon being put to the vote it was resolved by nine votes to six to delete the clause from the draft contract.—*Western Mail.*

"NOTES AT A DORSET WATERING PLACE."—In this article in our last, the reference to Chideock as "four miles west of Dorset" was (as was perhaps obvious) a slip of the pen; it should have read "west of Bridport."

A QUIETER BEDFORD-ROW.—On Wednesday last a deputation from Bedford-row attended at the Municipal Offices, Holborn, for the purpose of presenting a petition to the Mayor, Aldermen and Councillors of the Borough of Holborn requesting them to repave Bedford-row with quiet material in place of the present noisy stones. The deputation, which was introduced by Mr. Councillor Yates, consisted of Mr. Francis C. Adams, Mr. Edward F. Henley, the Hon. Norman Macleod Sinclair, Mr. Ernest C. Finch, and Mr. T. Bowden Green (Hon. Secretary of the Betterment of London Association and Street Noise Abatement Committee). Mr. Adams in presenting the petition pointed out that it was practically a unanimous one, having been signed by 153 firms and individuals, most of whom were solicitors, architects, estate agents, and auctioneers. The Mayor having informed Mr. Adams that the matter should certainly receive the careful consideration of the Council the deputation retired.

BUILDING MATTERS, SHEFFIELD.—The Surplus Lands Committee of the Sheffield City Council recommend the Council to adopt the tenders of Messrs. T. Lowe and Son, of Burton, of 17,840*l.*, and Mr. T. W. Ward, of Sheffield, of 1,350*l* for the erection of shops, with dwellings above, on a plot of land on the north-east side of Snig-hill. Mr. Ward's tender relates to ironwork only. The tender of Messrs. D. O'Neill and Sons for the erection of saleshops and dwelling houses on surplus land at the junction of Infirmary-road and Locke-street, for the sum of 3,709*l* has been accepted. At a meeting of the Highway Committee on December 4, letters were read from the Town Clerk explaining the present position of the Committee with regard to the Works Construction Department, and giving particulars as to the works now in hand, and the Sub-Committee also had an interview with Mr. F. W. Brock, the Manager of the Department. From the information given by the Manager, it appeared that the works at present in hand could not be finished for at least four months, this being dependent upon the weather; also that a large number of unsettled accounts, which the manager would have to deal with personally, were in hand, and that further assistance would be required for the measurement of the different works. The City Surveyor was authorised to arrange with Mr. Brock as to the employment of assistance, to enable the latter to complete the measurement of the various works and the settlement of the outstanding accounts at the earliest possible date.—*Sheffield Independent.*

ALTERATION IN CLAUSE IN CONTRACTS FOR PAINTING WORK, ETC., SCHOOL BOARD FOR LONDON.—The following is Clause 10 in the form of contract for painting and cleaning schools:—"10. All measured work and also all day work and materials which the Architect shall certify to be properly chargeable by the contractor as extras or additions or variations or to be properly allowable to the Board by the contractor as variations, omissions or deductions shall be respectively paid for or deducted at the rates set out in the Board's schedule of prices for repairs to buildings, etc., for 1902, with an addition of 10 per cent. to these rates, and in the event of any extra omitted or deducted works to which the items in the schedule do not apply then the amount to be paid or to be deducted in respect of any such work or materials shall be determined by the Architect, whose decision shall be final and binding on both parties." The Works Committee have had under consideration a letter from one of the firms tendering for the Board for this class of work, objecting to the wording of the clause, and the Committee have accordingly referred it to the Board's Measuring Surveyor, who has recommended that the clause should be altered as shown below: "10. All measured work and also all day work and materials which the Architect shall certify to be properly chargeable by the contractor as extras or additions or variations, or to be properly allowable to the Board by the contractor as variations, omissions or deductions, shall be respectively paid for or deducted, either (*a*) at the rates in the contractor's own priced quantities, so far as the prices apply (in which case the contractor must deposit his priced bills for examination before the contract is signed); and with regard to those items where the priced quantities do not apply, at the rates set forth in the Board's schedule of prices for repairs to buildings, etc., for 1902, plus 10 per cent.; or (*b*) at the rates set out in the Board's schedule of prices for repairs to buildings, etc., for 1902, with an addition of 10 per cent. to these rates. In the event of any extra omitted or deducted works to which the items in the schedule or in the priced bills of quantities deposited by the contractor do not apply, then the amount to be paid or to be deducted in respect of any such work or materials shall be determined by the Architect, whose decision shall be final and binding on both parties." The Works Committee are of opinion that this alteration might be adopted, as an experiment, for the group of contract works to be carried out next Easter, on the understanding that the question shall again be considered after the Committee have had an opportunity of ascertaining the effect of the alteration.

LEGAL.

A HASTINGS NUISANCE AND LIGHT AND AIR CASE.

THE case of Prior *v.* Tassell came before Mr. Justice Swinfen Eady in the Chancery Division on the 3rd inst.—an action by the plaintiffs, the owner and tenant of No. 2, Denmark-place, Hastings, against the defendant, the owner of

adjoining premises, for an injunction to restrain the defendant, his servants and agents, from carrying on the business of a restaurant-keeper and fried-fish vendor, and from selling iced drinks, etc., outside his premises, so as to be a nuisance to plaintiffs, and also to restrain the defendant from interfering by an erection, outside his premises, so as to obstruct or diminish the access of light and air to the plaintiffs' windows.

Mr. Micklem, K.C., and Mr. Turrell appeared for the plaintiffs, and Mr. Vernon-Smith, K.C., and Mr. Peterson for the defendant.

Mr. Micklem, in opening the case, said that at the beginning of the year or at the end of last year the defendant altered his premises on the ground floor and turned them into a shop. It was really an oyster bar, there being a charge of 3d. for anyone who did not buy oysters, and those who did came in for nothing. Early in the year an American drinking fountain was placed outside the premises, and a circular counter was put in front, taking away the forecourt altogether. A sun-blind was put up across the forecourt, and fish was fried in the basement. The obstruction to the plaintiffs' light was twofold, throwing the basement and ground floors into comparative darkness during the greater part of the day. At the rear of the house their light was also materially interfered with, but this obstruction had now been removed.

Mr. Vernon-Smith said that his client had granted an under-lease of the premises, and went out last August.

Mr. Micklem said that up to October 24 there had been no discontinuance of the nuisance of fried fish. This was done in a kitchen which had been excavated. The plaintiffs had lost lodgers owing to the nuisance from the smell from fried fish.

Mr. E. Cousins, land surveyor and agent, gave evidence as to the obstruction to light to the plaintiffs' premises from the defendant's blind.

Other evidence having been given, the defendant was called. He said that there was no offensive smell from the kitchen, and that the blind in no way interfered with the light to the plaintiffs' house.

Other evidence having been given on behalf of the defendant's case, Mr. Justice Swinfen Eady gave judgment on the 4th inst. His Lordship said, on the issue as to the alleged obstruction of light, it was quite possible that at some period of the afternoon some shade might be thrown upon the lower portion of the plaintiff's dining-room window and on the window in the basement. To his mind it was not proved, but he could conceive that it was possible. The question he had to consider was whether the sun-blind materially, or substantially, diminished or darkened the light of either the dining-room or the breakfast-room in the basement, and he did not believe that it did. At the nearest point, the blind was something like 8 ft. from the plaintiffs' premises. But the real substantial part of the action was the nuisance from smell. The nuisance began at Easter and ceased in August, when defendant left the premises. It had not been proved that defendant's successors continued the nuisance. On this point of the case he thought the plaintiffs had entirely failed to prove their case. The action wholly failed, and must be dismissed with costs.

Order accordingly.

ARCHITECTS' FEES.

His Honour Judge Owen had before him at Newport County-court recently a case in which Messrs. Linton and Barker, architects, of Newport, claimed 15*l.* 15s. for professional work executed for Mr. Bernasconi, ship chandler, etc., of Newport and Cardiff, in respect of structural alterations to the Newport premises. Mr. J. Moxon was for plaintiffs and Messrs. Stephens, David, and Co. defended. A sum of 10*l.* 10s. had been paid into court. The defence was that the charges were excessive.—His Honour gave judgment for plaintiffs for the amount claimed.

AN UNAUTHORISED STREET.

At Thames Police-court recently, an adjourned summons was heard against Mr. A. Davis, of Aldgate-street, Aldgate, for forming a street without first obtaining the sanction of the London County Council, under the London Building Act, 1894, Mr. Dalby, barister, appeared for the London County Council; and Mr. Macmorran, K.C., and Mr. Harold Brandon, barrister, instructed by Mr. Romain, defended. For the Council it was stated that section 6 of the London Building Act put all streets under the control of the Council. It was contended that Mr. Davis had no right to begin the street at all. The street was laid out between Morgan-street and Cannon-street-road, St. George's. Mr. Davis acquired the property, and, having pulled down 47 small houses, replaced them by six large blocks of dwelling houses. Those dwelling houses would require to have proper air space, and notices of the buildings were put up in the ordinary way, with the space at the back. The District Surveyor afterwards found that the back-rooms of 16 of the dwellings were being made into something like shops, but he was given to understand that they would not be approached from that side of the street, and was also distinctly told that the open space was being kept as the open space of the dwellings. The next thing the Surveyor found was that where the path had been the defendant was engaged in some underpinning. It was soon seen that what he was realy engaged in making was a street with a row of shops on either side. On behalf of the defendant, Mr. Macmoran, K.C., said the place in question was simply a Jewish bazaar, or small market. In Morgan-street there were blocks of buildings in which were from 800 to 1,000 souls of the Jewish persuasion, and the place, or open yard at the rear, was principally used by them to make purchases. It had been recognised by the Jewish authorities, who had sanctioned the opening of a place in which poultry could be killed. The place in question was lighted and cleansed by Mr. Davis, who could close it at any time. Mr. Haden Corser, having heard the evidence, said he would reserve his decision.

J. H. COLLS, APPELLANT, *V.* HOME AND COLONIAL STORES, LTD., RESPONDENTS.

In the House of Lords on the 8th inst., this case was considered before the Lord Chancellors and Lords Macnaghten, Shand, Davey, Robertson and Lindley.

This was an appeal from a decision of the Court of Appeal consisting of Lords Justices Vaughan Williams, Romer and Cozens-Hardy, reversing a judgment of Mr. Justice Joyce which was argued in the first instance on May 15th, 18th and 19th of this year, before their Lordships House, which was composed of the Lord Chancellor and Lords Shand, Davey and Robertson, when judgment was reserved. A short time back as noted in the *Builder* of November 28th, their Lordships signified to the parties that they desired the case to be reargued, and the rehearing began on Tuesday, December 8th, the tribunal being strengthened by the addition of Lord Macnaghten and Lord Lindley. The question was rather a refined one, and related to the application of the law as at present laid down in reference to ancient lights. It is worth noting that although there are a great many decisions on the actual point their Lordships are now called upon to decide, both in the Courts of first instance and in the Court of Appeal, the proposition now put forward for discussion has never before come under the consideration of the final tribunal. The question is whether the owner of ancient lights is entitled to the entire access of light of which he was previously in the enjoyment, or whether his right is limited to such an amount of light as is requisite only for the ordinary use of the premises for habitation or business.

Mr. Justice Joyce, held, on the evidence, that the appellants proposed new building would cut off a portion of the sky area formerly visible from within the respondents' offices, and would to some extent necessitate the use of artificial light in the front portion thereof more frequently and during somewhat longer hours than formerly. He considered that as after the erection of the proposed building the respondents' premises would still be sufficiently lighted for the ordinary occupation as a place of business, and the respondents' business was one not requiring a special amount of light, the respondents had no cause of action. On that ground he entered judgment for Mr. Colls with costs. The learned judge, however, in giving judgment pointed out that should it be held by the Court of Appeal that the respondents were entitled to the full amount of light they had previously enjoyed without appreciable diminution, they had established a good cause of action since by the erection of the proposed building they had suffered some loss, and would be in that case entitled to the injunction sought.

The Court of Appeal reversed that decision, holding that a right to ancient light, was a right to the enjoyment, not of sufficient light merely for the ordinary occupation of the premises either as a place of residence or for business, but, of the full amount of light which had been enjoyed during the prescriptive number of years by the owners or occupiers of the premises. The respondents therefore were entitled to the injunction they claimed. Mr. Colls had pleaded—and perhaps the decision on this question for practical purposes is the more important—that assuming the Home and Colonial Stores, Limited, were right, and that they were entitled in the opinion of the Court to the full and uninterrupted light previously enjoyed by them, the establishing of that right did not give them a right to an injunction, but only to an inquiry as to damages. It was urged that in view of the great value of land in London and other towns that it was unreasonable to stop by the issuing of a mandatory injunction a building owner from erecting on the site of old premises, buildings of a greater height than those pulled down. In the present instance the old premises were of two stories only. Having regard to the price that had been paid for the site, the cost of demolition and of rebuilding, if the new building was only to be of two stories, the rent that could be obtained would be wholly inadequate. It was urged also as a matter of law that where there was an alternative remedy—in this case an inquiry as to damages—that the power of the Court to grant an injunction, the operation of which would be unreasonable, was only discretionary. That having regard to the fact that the law of "give and take" necessarily came in between citizens, who as a right of citizenship had to give up many rights, by necessarily conforming to laws passed for the good of the general public, the Court in this instance ought not to grant an injunction.—Lord Justice Vaughan Williams in dealing with this part of the argument said that the Home and Colonial Stores, Ltd., had established their right to an injunction, and that as they persisted in that right and declined to accept instead such a sum as on inquiry might be found reasonable compensation for the damage they had sustained, the Court had no power to force a litigant to accept compensation and the injunction must therefore go. That view was also accepted by the other members of the Court, and the injunction subject to the appeal to their Lordships house directed to issue.

Mr. Bray, K.C., Mr. Leigh Clare and Mr. A. B. Nutter (instructed by Hyde, Tandy, Mahon and Sayer), appeared for the appellant; Mr. Haldane, K.C., Mr. Hughes, K.C., and Mr. W. E. Vernon (instructed by Slaughter and May) for the respondent company.

Mr. Bray in opening the appellants case referred at some length to the facts that gave rise to the litigation, which were fully reported in a previous issue of the *Builder*, and need merely be recapitulated very briefly here. The plaintiffs, the Home and Colonial Stores, Ltd., claimed an injunction to restrain the defendant, a builder and contractor, from erecting on the site of 44, Worship-street, E.C., any building or erection so as to darken, injure, or obstruct any of the ancient lights formerly enjoyed by the plaintiffs. At the time the action was brought, in December, 1901, the plaintiffs had about 17 years unexpired of a lease of a block of buildings on the east side of Paul-street, at the corner between that street and Worship-street, which runs westward from Paul-street, so that the plaintiffs' buildings had a west front to Paul-street and a south front of about 150 ft. in length to Worship-street, a tolerably broad thoroughfare of some 41 ft. across. Opposite a portion of the south front of the plaintiffs' premises in Worship-street was the site of some buildings recently removed that had stood 19 ft. 6 in. in height, and the defendant Mr. Colls had entered into a building agreement to erect on this site a building which, if and when completed, would be 42 ft. in height. Building operations having been commenced, the present proceedings were instituted. Meanwhile before the decision was given by the Court of Appeal the building was practicaly completed, so that the injunction, if issued, would be in a form compelling Mr. Colls to pull down some part at any rate of the house.

The learned counsel occupied the whole of Tuesday bringing before their Lordships' notice all the authorities from the earliest times bearing on his first proposition that where the diminution of ancient light by the building of premises, though substantial, was nevertheless not sufficient to make the premises adversely affected unfit for ordinary occupancy or business, the right to ancient light did not in that case give the owner thereof a cause of action. He pointed to a passage in Mr. Justice Joyce's judgment (which judgment the appellant asked should be restored) in which the learned judge said the evidence showed that the plaintiffs' premises would still after the erection of the defendant's building be well and sufficiently lighted for all ordinary purposes of occupancy as a place of business. In coming to the conclusion that the plaintiffs had no cause of action the learned judge thought, though after considerable hesitation, that Mr. Justice Wright's decision in Warren *v.* Brown (16, the *Times* L.R. 540; 1900, 2, Q.B. 722), if not reversed by the Court of Appeal, ought to govern the present case. The decision in Warren *v.* Brown was reversed by the Court of Appeal (see 18 the *Times* L.R., p. 55), and when the present case was before that tribunal their Lordships seemed to consider that they were bound to reverse the decision of Mr. Justice Joyce, otherwise their decision in Warren *v.* Brown would be inconsistent with the decision in the present case. The parties in

Warren *v.* Brown did not appeal to their Lordships' House.

The Lord Chancellor asked if the facts were similar in both cases.

Mr. Bray said the facts could be distinguished. In Warren *v.* Brown the business carried on by the occupier was that of a manufacturing hosier. The work needed especially good light in order to properly work the knitting machines. What the Court of Appeal there held was that it was no answer to a substantial interference with ancient light to say that abundant light remained for all ordinary purposes of inhabitancy or business. In the present case the business of the Home and Colonial Stores, Ltd., did not require "specially well-lighted" premises. Take for instance a photographer's business. Any interference with light to his studio would probably render the premises unfit altogether for that business. In that case, just as in the case of Warren *v.* Brown, it would be no answer to say "You still have light enough for ordinary business," because the reply would be, "If my business was that of an ordinary trade—a retail bootmaker, for instance, or as here, a grocer—I should have no real cause of complaint. My trade, however, is an exceptional one in this way, that I must have uninterrupted light to carry it on at all." That decision was not therefore a decision that need have bound the Court of Appeal, and of course the decision of the Court of Appeal was not binding on their Lordships.

The Lord Chancellor remarked that the Lord Chief Justice (Lord Alverstone) and Lords Justices Vaughan Williams and Romer formed the Court of Appeal before whom Warren *v.* Brown was argued. That was a strong Court, and their decision must be very clearly shown to be wrong before this House could overrule it.

Mr. Bray replied he was not arguing the case of Warren *v.* Brown.

The Lord Chancellor: I agree. But you are faced with this difficulty. You say, where there is left sufficient light for all purposes needed for the ordinary use of the premises, no action will lie. In Warren *v.* Brown the head note is, "If ancient lights are interfered with substantially and real damage ensues to the tenant or owner, an action lies. The fact that owing to the house being very well lighted, certain special businesses requiring much light are being or can be carried on there, cannot be disregarded in considering the effect of an interference, merely because after the interference other businesses not requiring much light can be carried on."

Mr. Bray replied that, assuming their Lordships held that the Court of Appeal was right, and that in the case of an ordinary business not requiring exceptional light a diminution of the light gave a cause of action, his submission would be that the remedy was compensation, and not a mandatory injunction.

The learned counsel had not concluded his argument when their Lordships rose, and the further hearing was adjourned until Thursday.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

26,396 of 1902.—R. BLAIR: *Jointed Boards for the Manufacture of Panelling, Linings, Flooring, Furniture, Casings, Casks, Barrels, and the like.*

According to this invention, in panelling, or wood work of the jointed or compound type, the fillets on the pieces or boards composing one ply or thickness of panelling or its equivalent are arranged to fit into corresponding grooves in the pieces composing the other ply or plys. The said grooves and fillets have curved sides, and there are not less than three complete fillets and two complete grooves in each piece or board, and are so arranged that on each meeting edge of the said pieces or boards an incomplete or half groove is presented, such half grooves forming complete grooves, into which fit central fillets on the other ply, for the purpose of locking the joints, when the respective pieces or boards are placed side by side and the respective plys or thicknesses are connected together.

24,582 of 1902.—E. W. LANCASTER and C. W. KREUSSLER: *Baths.*

A bath having a semi-circular, D-shaped, or other introverted form of foot end, having a waste and overflow chamber attached to foot end provided with means for attachment to a waste pipe, and having trunnions fixed to bath at centre of curve described by introverted end, the bath being adapted to be folded or turned up into a recess cupboard or cabinet provided with bearings to receive said trunnions.

24,655 of 1902.—J. KITCHEN: *Boilers and Furnaces used for Generating Steam, and for Heating Water for Hot-water Heating Apparatus, Domestic Supply, and other purposes.*

This consists in arranging the boiler and furnace in such a manner that the whole of the active combustion of the fuel takes place in the furnace itself before reaching the boiler, thus allowing the flame and heated gases only to impinge on the heating surface of the boiler.

3,575 of 1903.—T. WALTON and J. H. WALTON: *Apparatus for Steaming and Humidifying Air in Weaving Sheds, Spinning Mills, and like places.*

An apparatus for steaming and humidifying air in weaving sheds, spinning mills, and like places, consisting in the combination of a steam pipe having the inlet higher than the outlet, a trough or troughs above said steam pipe, all the troughs being on the same level and each containing pure water supplied continuously from a tank or reservoir, connexions with the steam pipe passed through each trough by which the pure water therein is heated by the steam without mixing with it; valves for regulating the supply of steam, and covers to the troughs for diverting the moisture arising therefrom.

16,762 of 1903.—G. H. STOUT and L. A. TURNER: *Gravity Locks.*

In a door lock, the combination with a suitable casing of a bolt plate having a projection formed on its upper front edge, said plate being pivoted in the casing at its rear lower corner so as to cause the bolt to assume by gravity a position whereby the projection thereon protrudes through an opening in the front of the casing, a knob spindle passing through the casing and forming the pivot of said plate, a notch formed in the plate adjacent to the spindle, a night latch tumbler journalled in the casing to engage said notch, a second spindle suitably mounted on the inside of the door and connected in operative relation with the said tumbler, a second notch formed above the first-mentioned notch, and a second tumbler and a key for operating said second tumbler to cause the same to engage said second notch to hold the bolt plate in locked position.

21,293 of 1903.—C. E. LAURENIUS: *Radiators or Heating Apparatus.*

A radiator or heating apparatus, consisting of an oblong iron jacket, both longitudinal sides being provided with extended hollow projections cast in one piece and running forwards and backwards under continuous slope, and forming canals for the heating medium, which projections, by having a similar position on both the said sides, and by meeting or nearly meeting at certain parts of their length, form at the same time a partition wall which is broken at certain places and compels the air, which is introduced from below as usual, to move in a zig-zag path in the jacket during its ascent.

21,572 of 1903.—A. J. BOULT (McKoy Clay Works): *Cutting and Delivery Devices for Clay and like Presses.*

A delivery table for green clay articles characterised by having on the cutter equipped longitudinally a reciprocable frame between the two end sections of the table top, an intermediate removable table top section, and a supplemental table for receiving the removable section.

20,644 of 1903.—W. U. GRIFFITHS: *Flushing Apparatus for Water-closets.*

In combination with a flush-tank having an outlet pipe embodying a port within said tank, a siphon hingedly disposed within said tank in such arrangement that when in one position its longer leg is in communication with said port and when in another position exposes said port so that water from the tank may rush directly thereinto, means for occasioning the movement of said siphon upon its hinge, said means comprising a cam mounted on the siphon and bevelled in opposite directions, a hinged closet-seat having an arm or extension, a pivoted lever mounted upon the flushing tank, and a rod depending from said lever the lower end of which is in proximity to said arm or extension.

393 of 1903.—T. CARRUTHERS: *Ventilators for Chimneys, Railway Carriages, and the like.*

This invention relates to ventilators for chimneys, railway carriages, and the like. The ventilator may be fixed to the top of a chimney to prevent back draught or smoke, or to exhaust vitiated air from the compartment of railway carriages, or the said ventilator may be used for sanitary purposes. In carrying out this invention, the ventilator is preferably constructed of fireclay, or it may be made of tin, in cylindrical form, with the lower end tapered and of smaller diameter than the upper part. Formed in the sides of the ventilator are slits or apertures into which are placed, from the inside of the ventilator, concave pieces one above the other. The concave pieces extend beyond the axis of the ventilator, and are inserted at opposite sides, so that when the smoke is passing up the ventilator it has a zig-zag course. The concave pieces are formed with stop pieces on the under side to prevent them from falling outwards through the apertures in the ventilator sides. In case the concave pieces should fall down the inside of the ventilator, the said pieces are prevented from dropping into the vent by reason of the ventilator being tapered at the bottom.

21,618 of 1903.—W. JOHNSON: *Appliance for Preventing or Curing Smoky Chimneys.*

This invention consists in an arrangement whereby the action from wind from any quarter which is usually the cause of smoking of domestic chimneys may be utilised in such way as actually to increase instead of impeding the draught. In applying the invention to a square chimney there is constructed of brick, clay, stone, cement, metal, or other material in a cubical or approximately cubical structure of the thickness of the chimney brickwork, which is inserted at any convenient height in the chimney, but preferably near the top, where it is well exposed to the action of the wind. This insertion is perforated with a series of horizontal passages at the outside of the chimney, which pass into a single vertical or nearly vertical passage at the inside of the chimney. The effect of this arrangement is that a force of wind pressing against the chimney is deflected, and a part of the air is increased in velocity in an upward direction inside the chimney, and should that force of wind passing over the top of the chimney tend, as it sometimes does, to invade the exit, and cause smoke to be driven down, that tendency is made by the action of the appliance to have a counteracting opposite effect. Similar appliances may be inserted in each face of the chimney, either at the same level or at different levels, so as to provide for similar action on the draught, from whatever quarter the wind may blow. The invention can also be applied to a stack of chimneys.

25,772 of 1902.—J. C. ETCHELLS: *Apparatus for Automatic Supply of Water from Low Pressure Mains to Fire Mains, Tanks, or other Receptacles.*

An apparatus for supplying water from a low pressure main at a higher pressure to a delivery main, the combination therewith of a high pressure water supply opening into the delivery main, a controlling valve placed in high pressure main, a cylinder in communication with the delivery main, and a piston or ram therein which is actuated by the pressure in the delivery main to close the high pressure valve, and a weight or spring connected to the said valve to open it when the pressure in the delivery main is reduced.

24,653 of 1903.—B. MCDOUGALL: *Construction of Roofs, Ceilings, and Floors.*

A floor and roof construction consisting of a series of joists or bars radiating from a common centre unsupported except at their outer ends, and concentric bands or rings engaging said bars or joists and uniting them into a rigid structure.

761 of 1903.—J. KULHANEK: *Iron Structures.*

Material for the erection of temporary or semi-permanent iron structures, such as pillars, posts, uprights, standards, stairs, girders, bridges, or truss or strut framework, which, after a structure which it has served to build is taken to pieces, may again be used for fresh structures or other building purposes without any alterations or repair, such building material consisting of pieces of sections of flat or angle bar iron, either straight or bent to the shape of triangles or squares, and provided with equidistant round or elongated openings.

21,799 of 1903.—P. M. JUSTICE (Aktieselsrabet, Venezuela-Asfalt Kompagnie): *Manufacture of Artificial Asphalt.*

The manufacture of artificial asphalt in which Orinoco asphalt oil and powdered limestone containing lime or lime flour, are mixed together.

16,585 of 1903.—G. C. MARKS (E. R. Knapp): *Indirect Heating System for Buildings.*

An indirect heating system for a building, consisting in the combination with a common air box in the basement or lower part of the building or a number of upwardly extending air flues communicating with such air box and leading one to each room, each of such flues containing suitable heating pipes connected with common mains in the air box, and being fitted with inlet air registers at the lower ends, the arrangement being such that the inlet of heating medium to the respective pipes and inlet of air to the flue of any room may be regulated by devices available in that room.

* All these applications are in the stage to which opposition to the grant of Patent upon them can be made.

MEETINGS.

FRIDAY, DECEMBER 11.

Tramways and Light Railways Association (Society of Arts, John Street Adelphi).—Mr. Atherley-Jones, K.C., M.P. (President), on "Protection in Special Relation to Tramway and Light Railway Enterprise." 8 p.m.

SATURDAY, DECEMBER 12.

The British Association of Waterworks Engineers.—Eighth Winter Meeting to be held at the Geological Society's Rooms, Burlington House, W. (1) Ballots will be taken for the Council and Officers for 1904-5, and for new Members and Associates. (2) Prof. Henry Robinson on "The Storage of Flood Water" (3) Mr. Alfred J

Jenkins on "The New Reservoir for the Hoylake and West Kirby Waterworks." (4) Mr. Neil J. Peters on "The Cogan Extensions of the Cardiff Corporation Waterworks." 11 a.m.

MONDAY, DECEMBER 14.

Royal Institute of British Architects.—Mr. William Henman and Mr. Henry Lea, C.E., on "The Royal Victoria Hospital, Belfast: its Inception, Design, and Equipment." Illustrated by lantern slides. 8 p.m.

Society of Arts (Cantor Lectures).—Mr. Bennett H. Brough on "The Mining of Non-Metallic Minerals." IV. 8 p.m.

Incorporated Clerks of Works' Association (Carpenters' Hall, London Wall).—Paper by Mr. Arthur T. Bolton, entitled, "Ingram Houses. Residential Clubs for Young Men." 8.30 p.m.

Society of Engineers.—Annual General Meeting. 7.30 p.m.

Builders' Benevolent Institution.—Executive Committee. 5 p.m.

TUESDAY, DECEMBER 15.

Institution of Civil Engineers—(1) Professor J. Campbell Brown, D.Sc., on "Deposits in Pipes and other Channels conveying Potable Water." (2) Messrs. Osbert Chadwick, C.M.G., and Bertram Blount on "The Purification of Water highly charged with Vegetable Matter; with Special Reference to the Effect of Æration." 8 p.m.

Society of Arts (Applied Art Section).—Mr. F. Warner on "The British Silk Industry." 8 p.m.

Institute of Sanitary Engineers, Ltd. (Lectures in Practical Sanitary Science).—Mr. B. R. Tucker on "Ventilation of Dwellings and Public Buildings." 7 p.m.

WEDNESDAY, DECEMBER 16.

The Discussion Section of the Architectural Association.—Mr. A. O. Collard on "The Work of an 'Exhibition' Architect." 7.30 p.m.

London Master Builders' Association.—Finance Committee. 4 p.m.

St. Paul's Ecclesiological Society.—Mr. F. Bligh Bond on "Roodscreens and Roodlofts," illustrated by limelight lantern views. 8 p.m.

Institute of Sanitary Engineers, Ltd.—(1) Half-yearly Meeting. 4.30 p.m. (2) Annual Dinner, Holborn Restaurant. 6.30 p.m.

Builders' Foremen and Clerk of Works' Institution.—Annual Meeting of the Directors. 7 p.m.

Edinburgh Architectural Association.—Mr. W. E. Snell on "The Objects of the Garden City Association." 8 p.m.

THURSDAY, DECEMBER 17.

Institution of Electrical Engineers—Mr. P. V. McMahon on "The City and South London Railway: Working Results of the Three-wire System applied to Traction. 8 p.m.

London Master Builders' Association.—Council Meeting. 4 p.m.

Leeds and Yorkshire Architectural Society.—Mr. J. B. Mitchell-Withers on "Sir Christopher Wren: his Time and Works." 6.30 p.m.

FRIDAY, DECEMBER 18.

Architectural Association.—Mr. G. P. Bankart on "Old Stucco and Plaster Work, with Reference to Modern Possibilities." 7.30 p.m.

Institution of Mechanical Engineers.—Mr. C. E. Stromeyer and Mr. W. B. Baron on "The Working of Various Water-softeners." 8 p.m.

Institution of Civil Engineers (Students' Meeting).—(1) Mr. C. B. Case on "The Action of the Sea upon the Foreshore." (2) Mr. F. W. Cable on "The Causes of the Loss of Beaches." 8 p.m.

Glasgow Architectural Craftsmen's Society.—Debate: "Should Architects be Final Arbiters in Disputes on Contracts for their own Work?" Affirmative: Mr. R. N. Horn, A.R.I.B.A. Negative: Mr. Isaac Low, jun. 8 p.m.

SATURDAY, DECEMBER 19.

Junior Institution of Engineers.—Visit to the Electricity Works of the Walthamstow Urban District Council Train leaves Liverpool-street at 2.23 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

November 20.—By MORRIS, MARSHALL & POOLE (at Bishop's Castle).

Snead, &c., Montgomery.—White House Farm, and holding adjoining, 128 a. 0 r. 30 p., f.... £3,500

November 26.—By STANDRING & GORBUTT (at Doncaster).

Belton, Lincs.—Hirst Priory Estate, together with Little Hirst and Moss Wood farms, 443a. 2 r. 24 p., f. and c., y.r. 700*l.* 18,000

November 30.—By BRODIE, TIMBS & CO.

Woolwich, Kent.—1 and 2, George-st., and 48a, 48b, and 48c, Chapel-st. (S.), area 4,000 ft. f., y.r. 70*l.* 1,700

By ELLIOTT, SON, & BOYTON.

Hackney.—86, King Edward-rd., u.t. 31 yrs., g.r. 9*l.*, p. 470

By P. & G. GEEN

Reversion to 22, 23, and 24, North-st., Lambeth, f., w.r. 99*l.* 16s., also f.g.r. 105*l.*, reversion in 65 yrs., life aged 65 2,500

Peckham.—2, Copeland-rd., u.t. 52 yrs., g.r. 6*l.* 6s., y.r. 50*l.* 450

By OGDEN, SONS, & OLLEY.

Wimbledon.—20, Kenilworth-av., u.t. 90½ yrs., g.r. 8*l.* 10s., e.r. 55*l.* 550

By FRED VARLEY & SON.

Highbury.—43, Riversdale-rd., u.t. 67 yrs., g.r. 7*l.*, y.r. 33*l.* 350

Finsbury Park.—50, Ambler-rd., u.t. 64 yrs., g.r. 5*l.*, y.r. 50*l.* 500

Bow.—1, Wilson-st. (S.), u.t. 59 yrs., g.r. 6*l.*, y.r. 33*l.* 225

December 1.—By C. W. DAVIES & SON.

Islington.—Liverpool-rd., f.g.r. 68*l.* 10s., reversion in 52½ yrs. 1,195

196 and 198, Liverpool-rd., (S.), f. w.r. 59*l.* 16s. 455

City-rd.—1, Gordon-st., f., y.r. 36*l.* 585

Islington.—19, Waterloo-ter., u.t. 27½ yrs., g.r. 5*l.* 5s., y.r. 45*l.* 350

Hoxton.—42, Herbert-st., u.t. 38½ yrs., g.r. 6*l.* 6s. e.r. 68*l.* 450

Kentish Town.—33 and 35, Burghley-rd., u.t. 53¼ yrs., g.r. 12*l.* 8s., y.r. 90*l.* £840

Hoxton.—39, Napier-st., u.t. 46¼ yrs., g.r. 13*l.* w.r. 44*l.* 4s. 150

By DEBENHAM, TEWSON & CO.

Ealing.—Warwick-rd., a perpetual rent charge of 10*l.* 235

By HAMPTON & SONS.

East Tilbury, Essex.—Rectorial Tithe Rent Charges of 388*l.* 3,700

South Nutfield, Surrey.—Ridge Green House and 11 a. 2 r. 30 p., f., p. 9,400

By MABBETT & EDGE.

Woodford Green, Essex.—Four freehold cottages and laundry, area 1 a. 0 r. 4 p., w.r. 135*l.* 4s. Monkham's-la., seven freehold cottages and 1 a. 3 r. 16 p., w.r. 162*l.* 3,000

By FREDK. WARMAN.

Stoke Newington.—20, Lidfield-rd., u.t. 57 yrs., g.r. 5*l.*, e.r. 34*l.* 350

De Beauvoir Town.—49, Ardleigh-rd., u.t. 20 yrs., g.r. 3*l.*, y.r. 50*l.* 350

Finsbury Park.—86, Regina-rd., u.t. 63 yrs., g.r. 6*l.* 6s., y.r. 40*l.* 360

By J. C. PLATT (at Hammersmith).

Hammersmith.—69 and 70, Rednall-ter., u.t. 75½ yrs., g.r. 6*l.* 5s., w.r. 72*l.* 16s. 595

Chiswick.—205 and 207, Devonshire-rd. (S.), f., w.r. 94*l.* 18s. 860

32 and 34, Fisher's-la., f., w.r. 45*l.* 10s. 445

By WATERS & RAWLENCE (at Salisbury).

Handley, Dorset.—Handley House and 4 a. 2 r. 0 p., f., p. 710

December 2.—By CURTIS & SHARP.

Stratford.—24 to 46 (even), Rokeby-st., u.t. 66 yrs., g.r. 43*l.*, w.r., 270*l.* 8s. 1,480

5 to 39 (odd), Arthingworth-st. u.t. 66 yrs., g.r. 63*l.*, w.r. 380*l.* 18s. 2,080

West Ham.—38 and 46, Church-st. South, f., w.r. 47*l.* 9s. 470

Plaistow.—2 Samson-st., f., w.r. 24*l.* 14s. 295

Canning Town.—Victoria Dock-rd, the Old Ship, b.-h., f., y.r. 50*l.* 1,400

26 to 48 (even), Berwick-rd, f., w.r. 280*l.* 16s. 2,280

By FOSTER & CRANFIELD.

Knightsbridge.—3, Park Side (S.), Profits Rentals of 89*l.* for 13 yrs. and 70*l.* for 7 yrs. 1,125

Park Side, f.g.r. 30*l.*, reversion in 13 yrs. 3,450

7, Park Side (S.), part f. and part u.t. 14 yrs., g.r. 65*l.*, y.r. 225*l.* 3,200

4, Park Side (S.), profit rental of 115*l.* for 11 yrs. 760

Hampstead-rd.—2, Edward-st., y.r. 80*l.*; also i.g.r. 10*l.*, u.t. 65½ yrs., g.r. 45*l.* 460

By HILLYER & HILLYER.

Tottenham.—20, Highweek-rd., u.t. 79 yrs., g.r. 4*l.* 10s., w.r. 29*l.* 18s. 186

51, Beaconsfield-rd., u.t. 73 yrs., g.r. 6*l.*, p. 215

2a, Brunswick-rd., u.t. 73 yrs., g.r. 6*l.*, p. 185

188 and 190, Seaford-rd., u.t. 78 yrs., g.r. 8*l.* 8s. p. 371

By WATERS & RAWLENCE (at Frome).

Witham Friary, Somerset.—Alleyfield Farm, 111 a. 2 r. 29 p., f., y.r. 140*l.* 3,000

By J. H. BULMER.

Rotherhithe.—60 to 65 (even), Neptune-st., f. w.r. 66*l.* 6s. 1,000

Tottenham.—47, Russell-rd., u.t. 72½ yrs., g.r. 5*l.* 5s., w.r. 32*l.* 10*l.* 200

December 3.—By EDWIN EVANS.

Chiswick.—High-rd., Merton House Building Estate, area 1¾ a., f., p. 8,250

Pimlico.—142, Tachbrook-st., u.t. 34 yrs., g.r. 11*l.*, y.r. 60*l.* 660

Wandsworth.—15 to 21 (odd), Lavenham-rd., u.t. 97 yrs., g.r. 22*l.*, w.r. 130*l.* 720

62 to 68 (even), 76 and 80, Trentham-st., u.t. 97 yrs., g.r. 30*l.* 10*l.*, w.r. 187*l.* 4s. 1,170

39, Lonsdale-ter., u.t. 97 yrs., g.r. 5*l.* 5s., w.r. 31*l.* 4s. 205

615, Wandsworth-rd. (S.), u.t. 66½ yrs., g.r. 6*l.*, e.r. 60*l.* 510

Battersea.—22, Rosenau-rd., u.t. 76¾ yrs., g.r. 7*l.*, y.r. 40*l.* 395

11, 13 and 15, Abyssinia-rd., f., w.r. 106*l.* 12s. 1,200

Wembley, Middlesex.—Alperton-rd., two freehold building plots 140

By DUNN, SOMAN & COVERDALE.

Hampstead.—Flask Walk, Flask Tavern, f.g.r. 100*l.*, reversion in 31 yrs. 3,500

34 and 36, Flask Walk, f., y.r. 60*l.* 700

38 to 44 (even), Flask Walk, f., w.r., 68*l.* 18s. ... 400

46 and 48, Flask Walk, f., y.r. 74*l.* 520

Flask Walk, &c., f.g.r. 34*l.* 10s., reversion in 66 yrs. 900

Gardnor-rd., f.g.r. 48*l.*, reversion in 66 yrs. 1,250

By NEWBON, EDWARDS & SHEPHARD.

Regent's Park.—11, Titchfield-ter., u.t. 18 yrs., g.r. 12*l.* 10s., e.r. 65*l.* 240

Islington.—6, Hanover-st., f., y.r., 40*l.* 675

20, Union-sq., u.t. 33 yrs., g.r. 7*l.* 15s., y.r. 55*l.* ... 430

Holloway.—Wellington-rd., &c., i.g.r. 75*l.*, u.t. 40 yrs., g.r. nil 1,155

32, Parkhurst-rd., u.t. 42 yrs., g.r. 8*l.*, y.r. 50*l.* ... 395

Hornsey Rise.—129, Elthorne-rd., u.t. 63 yrs., g.r. 7*l.*, e.r. 38*l.* 340

Stamford Hill.—37, Ravensdale-rd., u.t. 67 yrs., g.r. 14*l.* 10s., y.r. 45*l.* 275

Stoke Newington.—236, High-st. (S.), u.t. 70 yrs., g.r. 13*l.*, y.r. 150*l.* 2,000

83, 85 and 87, Bouverie-rd., u.t. 67½ yrs., g.r. 16*l.* 10s., y.r. 103*l.* 1,105

Stratford.—6, 8 and 10, Albert-rd., f., y.r. 90*l.* 12s. 825

Hackney.—61 and 63, Hassard-st., u.t. 69¼ yrs., g.r. 11*l.*, w.r. 67*l.* 12s. 470

By STIMSON & SONS.

Forest Hill.—South-rd., Highfield and 1¼ a., u.t. 32 yrs., g.r. 17*l.*, y.r. 87*l.* 650

3, South-rd., also Derwent House and Oakland House, u.t. 32 yrs., g.r. 18*l.*, y.r. 166*l.* 670

Stanstead-rd., f.g.r. 18*l.* 10s., reversions in 56 and 62 yrs. 440

Beadnell-rd., f.g.r. 40*l.*, reversion in 62 yrs. ... 970

Catford.—Rutland-rd., f.g.r. 26*l.*, reversion in 67 yrs. 595

59, Holbeach-rd., f., e.r. 32*l.* 385

Walworth.—Royal-rd., Royal Standard, b.-h., f.g.r. 60*l.*, reversion in 53 yrs. 1,550

1, 3, 5 and 7, Cook's-rd., f., w.r. 107*l.* 18s. 900

Norwood.—56 and 58, Gipsy Hill f., y.r. 115*l.* 1,680

Woodland Hill, freehold land and buildings thereon, e.r. 35*l.* 370

21 to 27 (odd), Woodland Hill, u.t. 63½ yrs., gr. 26*l.* 16s., y.r. 135*l.* £900

30, 32, 34 and 44, Woodland Hill, f., y.r. 112*l.* 1,430

Woodland-rd., f.g.r. 16*l.*, reversion in 67½ yrs. 400

37 and 39, Woodland-rd., u.t. 75½ yrs., g.r. 15*l.*, y.r. 71*l.* 50

Woodland Hill, f.g.r. 16*l.*, reversion in 68 yrs. 445

Woodland-rd., f.g.r. 49*l.* 7s., reversion in 55 yrs. 1,215

65 to 71 (odd), Woodland-rd., f., w.r. 75*l.* 8s. 770

61, 65, 67, 69 and 71, High-st., w.r. 143*l.* 6s.; also i.g.r. 47*l.* 10s., u.t. 34 yrs., g.r. 9*l.* 1,540

105, High-st. (S.), u.t. 9 yrs., g.r. 4*l.*, y.r. 30*l.* 105

Tooting.—High-st., &c., i.g.r. 213*l.* 4s., u.t. 17½ yrs., g.r. 90*l.* 1,580

By A. DOWELL (at Edinburgh).

Duirinish, Inverness-shire.—The estate of Glendale, 25,000 a. 15,000

December 4.—By HIND & SONS.

Hackney.—1 to 6, Cambridge Lodge Villas; also Cambridge Lodge, area 55,000 ft., f., e.r. 445*l.* 10,000

St. George's East.—27 to 39 (odd), Philip-st.; 6, 8 and 10, Ellen-st.; 1, 2 and 3, Ellen-ct., f., y.r. 393*l.* 18s. 4,000

Hackney.—3, Bayford-st., u.t. 68 yrs., g.r. 5*l.*, y.r. 34*l.* 255

Bethnal Green.—Seabright-gdns, &c., i.g.r. 94*l.*, u.t. 9 and 81 yrs., g.r. 21*l.* with reversion... 240

By PERCIVAL HODSON.

Paddington.—11, Hampden-st., u.t. 41 yrs., g.r. 5*l.*, y.r. 48*l.* 280

By MARTEN & CARNABY.

Streatham.—88 and 90, Knolly's-rd., u.t. 73 yrs., g.r. 16*l.*, y.r. 98*l.* 780

By RICHARDSON & BOOTH.

Lewisham.—169, High-st., area ½ a. f., e.r. 120*l.* 3,200

***Contractions used in these lists.*—F.g.r.** for freehold ground-rent; **l.g.r.** for leasehold gound-rent; **i.g.r.** for improved ground-rent; **g.r.** for ground-rent; **r.** for rent; **f.** for freehold; **c.** for copyhold; **l.** for leasehold; **p.** for possession; **e.r.** for estimated rental; **w.r.** for weekly rental; **q.r.** for quarterly rental; **y.r.** for yearly rental; **u.t.** for unexpired term; **p.a.** for per annum; **yrs.** for years; **la.** for lane; **st.** for street; **rd.** for road; **sq.** for square; **pl.** for place; **ter.** for terrace; **cres.** for crescent; **av.** for avenue; **gdns.** for gardens; **yd.** for yard; **gr.** for grove; **b.h.** for beer-house; **p.h.** for public-house; **o.** for offices; **s.** for shops; **ct.** for court.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.	
Hard Stocks.....	1	16	6	per 1,000 alongside, in river
Rough Stocks and Grizzles	1	13	0	" " "
Facing Stocks ...	2	12	0	" " "
Shippers	2	5	0	" " "
Flettons.....	1	10	0	" at railway depôt
Red wire Cuts ...	1	13	0	" " "
Best Fareham Red	3	12	0	" " "
Best Red Pressed Ruabon Facing	5	0	0	" " "
Best Blue Pressed Staffordshire ...	4	4	0	" " "
Do. Bullnose	4	10	0	" " "
Best Stourbridge Fir Brick.....	4	8	0	" "
GLAZED BRICKS.				
Best White and Ivory Glazed Stretchers.....	13	0	0	" " "
Headers	12	0	0	" " "
Quoins, Bullnose, and Flats	17	0	0	" " "
Double Stretchers	19	0	0	" " "
Double Headers...	16	0	0	" " "
One Side and two Ends.....	19	0	0	" " "
Two Sides and one End	20	0	0	" " "
Splays, Chamfered, Squints.....	20	0	0	" " "
Best Dipped Salt Glazed Stretchers and Headers	12	0	0	" " "
Quoins, Bullnose, and Flats	14	0	0	" " "
Double Stretchers	15	0	0	" " "
Double Headers...	14	0	0	" " "
One Side and two Ends.....	15	0	0	" " "
Two Sides and one End	15	0	0	" " "
Splays, Chamfered, Squints.....	14	0	0	" " "
Second Quality White and Dipped Salt Glazed.....	2	0	0	" less than best.

	s.	d.	
Thames and Pit Sand	6	9	per yard, delivered.
Thames Ballast	6	0	" "
Best Portland Cement	30	0	per ton, delivered.
Best Ground Blue Lias Lime ...	21	0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fire Clay in sacks 27s. 6d. per ton at rly. dpt.

STONE.

	s.	d.	
BATH STONE—delivered on road waggons, Paddington depôt	1	6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt.....	1	8½	" "

PORTLAND STONE (20 ft. average)—

Brown Whitbed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2	1	" "
White Basebed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2	2½	" "

PRICES CURRENT (*continued*).

STONE.

	s.	d.	
Ancaster in blocks	1	11	per ft. cube, deld. rly. depôt
Beer in blocks	1	6	" "
Greenshill "	1	10	" "
Darley Dale in blocks	2	4	" "
Red Corsehill "	2	5	" "
Closeburn Red Freestone	2	0	" "
Red Mansfield "	2	4	" "

YORK STONE—*Robin Hood Quality.*

	s.	d.	
Scappled random blocks	2	10	per ft. cube, deld. rly. depôt
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per foot super. "
6 in. Rubbed two sides Ditto, Ditto	2	6	" "
3 in. Sawn two sides slabs (random sizes)	0	11½	"
2 in. to 2½ in. Sawn one side slabs (random sizes)	0	7½	" "
1½ in. to 2 in. ditto, ditto	0	6	" "
Scappled random blocks	3	0	per ft. cube "
6 in. sawn two sides, landings to sizes (under 40 ft. sup.)	2	8	per ft. super. "
6 in Rubbed two sides Ditto	—		" "
3 in. sawn two sides slabs (random sizes)	1	2	" "
2 in. self-faced random flags	0	5	" "

Hopton Wood (Hard Bed) in blocks 2 3 per ft. cube.
" " " 6 in. sawn both sides landings 2 7 per ft. super. deld. rly. depôt.
" " " 3 in. do. 1 2½ " "

SLATES.

In. in.	£	s.	d.	
20×10 best blue Bangor	13	2	6	per 1000 of 1200 at rly.dep.
20×12 " "	13	17	6	" "
20×10 best seconds "	12	15	0	" "
20×12 " " "	13	10	0	" "
16×8 best "	7	0	0	"
20×10 best blue Portmadoc	12	12	6	" "
16×8 best blue Portmadoc	6	12	6	" "
20×10 best Eureka unfading green	15	2	6	" "
20×12 best Eureka unfading green	17	2	6	" "
18×10 " "	12	10	0	" "
16×8 " "	10	5	0	" "
20×10 permanent green	11	10	0	" "
18×10 " "	9	10	0	" "
16×8 "	6	10	0	" "

TILES.

	s.	d.	
Best plain red roofing tiles	42	0	per 1,000 at rly. depot.
Hip and valley tiles	3	7	per doz. " "
Best Broseley tiles	50	0	per 1,000 " "
Do. Ornamental Tiles	52	6	" " "
Hip and Valley tiles	4	0	per doz. " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000 " "
Do. Ornamental Do.	60	0	" " "
Hip tiles	4	0	per doz. " "
Valley tiles	3	0	" " "
Best Red or Mottled Staffordshire Do. (Peakes)	51	9	per 1,000 " "
Do. Ornamental Do.	54	6	" " "
Hip tiles	4	1	per doz. " "
Valley tiles	3	8	" " "
Best "Rosemary" brand plain tiles	48	0	per 1,000 " "
Do. Ornamental Do	50	0	" " "
Hip tiles	4	0	per doz. " "
Valley tiles	3	8	" " "

WOOD.

	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	15	10	0	16	10	0
Deals: best 3 by 9	14	10	0	15	10	0
Battens: best 2½ in by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	10	0	12	10	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less thn best		
Battens: seconds	0	10	0	" " "		
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	9	10	0
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	9	10	0
Foreign Sawn Boards— 1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	"		
Fir timber: Best middling Danzig or Memel (average specification)	At per load of 50 ft. 4	10	0	5	0	0
Seconds	4	5	0	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	3	15	0
Small timber (6 in. to 8 in.)	3	0	0	3	10	0
Swedish balks	2	15	0	3	0	0
Pitch-pine timber (30 ft. average)	3	5	0	3	15	0

JOINERS' WOOD.

	At per standard. £	s.	d.	£	s.	d.
White Sea: First yellow deals, 3 in. by 11 in.	23	0	0	24	0	0
3 in. by 9 in.	21	0	0	22	10	0
Battens, 2½ in. and 3 in. by 7 in.	17	0	0	18	10	0
Second yellow deals, 3 in. by 11 in.	18	10	0	20	0	0
" " 3 in. by 9 in.	17	10	0	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	15	10	0	16	10	0
Battens, 2½ in. and 3 in. by 7 in.	11	10	0	12	10	0
Petersburg: first yellow deals, 3 in. by 11 in.	21	0	0	22	10	0
Do. 3 in. by 9 in.	18	0	0	19	10	0
Battens	13	10	0	15	0	0

PRICES CURRENT (*continued*).

WOOD.

JOINERS' WOOD.

	At per standard. £	s.	d.	£	s.	d.
Petersburg: second yellow deals, 3 in. by 11 in.	16	0	0	17	0	0
Do. 3 in. by 9 in.	14	10	0	16	0	0
Battens	11	0	0	12	10	0
Third yellow deals. 3 in. by 11 in.	13	10	0	14	0	0
Do. 3 in. by 9 in.	13	0	0	14	0	0
Battens	10	0	0	11	0	0
White Sea and Petersburg:—						
First white deals, 3 in. by 11 in.	14	10	0	15	10	0
" " 3 in. by 9 in.	13	10	0	14	10	0
Battens	11	0	0	12	0	0
Second white deals, 3 in. by 11 in,	13	10	0	14	10	0
" " 3 in. by 9 in.	12	10	0	13	10	0
" " battens	9	10	0	10	10	0
Pitch-pine: deals	16	0	0	18	0	0
Under 2 in. thick extra	0	10	0	1	0	0
Yellow Pine—First, regular sizes	33	0	0	upwards.		
Oddments	22	0	0	24	0	0
Seconds, regular sizes	24	10	0	26	10	0
Yellow Pine Oddments	20	0	0	22	0	0
Kauri Pine—Planks, per ft. cube	0	3	6	0	4	6
Danzig and Stettin Oak Logs—Large, per ft. cube	0	2	6	0	3	6
Small " "	0	2	3	0	2	6
Wainscot Oak Logs, per ft. cube	0	5	0	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	7	0	0	8
¾ in. do. do.	0	0	6½	—		
Dry Mahogany—Honduras, Tabasco, per ft. sup. as inch	0	0	9	0	0	11
Selected, Figury, per ft. sup. as inch	0	1	6	0	2	0
Dry Walnut, American, per ft. sup. as inch	0	0	10	0	1	0
Teak, per load	17	0	0	21	0	0
American Whitewood Planks—per ft. cube	0	4	0	—		

Prepared Flooring— Per square.

1 in. cy 7 in. yellow, planed and shot	0	13	6	0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	1	1	6
1 in. by 7 in. white, planed and shot	0	11	6	0	13	6
1 in. by 7 in. white, planed and matched	0	12	0	0	14	0
1¼ in. by 7 in. white, planed and matched	0	14	6	0	16	6
¾ in. by 7 in. yellow, matched and beaded or V-jointed boards	0	11	0	0	13	6
¾ in. by 7 in. do. do. do.	0	14	0	0	18	0
1 in. by 7 in. white do. do.	0	10	0	0	11	6
1 in. by 7 in. do. do. do.	0	11	6	0	13	6

6-in. at 6d. to 9d. per square less than 7-in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £	s.	d.	£	s.	d.
Rolled Steel Joists, ordinary sections	6	5	0	7	5	0
Compound Girders, " "	8	2	6	9	5	0
Angles, Tees and Channels, ordinary sections	7	17	6	8	17	6
Flitch Plates	8	5	0	8	15	0
Cast Iron Columns and Stanchions, including ordinary patterns	7	2	6	8	5	6

METALS.

	Per ton, in London £	s.	d.	£	s.	d.
IRON—						
Common Bars	7	10	0	8	0	0
Staffordshire Crown Bars, good merchant quality	8	0	0	8	10	0
Staffordshire "Marked Bars"	10	10	0	—		
Mild Steel Bars	8	15	0	9	5	0
Hoop Iron, basis price	9	5	0	9	10	0
" " galvanised	17	10	0	—		

(*And upwards, according to size and gauge.)

Sheet Iron (Black)— Ordinary sizes to 20 g.	9	15	0	—		
" " 24 g.	10	15	0	—		
" " 26 g.	12	5	0	—		
Sheet Iron, Galvanised, flat, ordinary quality— Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g	12	15	0	—		
Ordinary sizes to 22 g. and 24 g.	13	5	0	—		
" " 26 g.	14	5	0	—		
Sheet Iron, Galvanised, flat, best quality— Ordinary sizes to 20 g.	16	0	0	—		
" " 22 g. and 24 g.	16	10	0	—		
" " 26 g.	18	0	0	—		
Galvanised Corrugated Sheets— Ordinary sizes, 6 ft. to 8 ft. 20 g.	12	15	0	—		
" " 22 g. and 24 g.	13	5	0	—		
" " 26 g.	14	0	0	—		
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11	15	0	—		
Best Soft Steel Sheets, 22 g. and 24 g.	12	15	0	—		
" " " 26 g.	14	0	0	—		
Cut nails, 3 in. to 6 in.	9	5	0	9	15	

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London. £	s.	d.	£	s.	d.
LEAD—Sheet, English, 3 lbs. and up	13	17	6	—		
Pipe in coils	14	7	6	—		
Soil pipe	16	17	6	—		
Compo Pipe	16	17	6	—		
ZINC—Sheet—						
Vieille Montagne ton	26	5	0	—		
Silesian	26	0	0	—		
COPPER—						
Strong Sheet per lb.	0	0	10½	—		
Thin "	0	0	11½	—		
Copper nails "	0	0	11	—		

PRICES CURRENT (*continued*).

LEAD, &c.

	£	s.	d.	£	s.	d.
BRASS—						
Strong Sheet per lb.	0	0	10	—		
Thin "	0	0	11	—		
TIN—English Ingots "	0	1	3	—		
SOLDER—Plumbers' "	0	0	6	—		
Tinmen's "	0	0	8	—		
Blowpipe "	0	0	9	—		

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2d.	per ft. delivered
" fourths	1½d.	" "
21 oz. thirds	3d.	" "
" fourths	2½d.	" "
26 oz. thirds	3½d.	" "
" fourths	3d.	" "
32 oz. thirds	4½d.	" "
" fourths	4d.	" "
Fluted sheet, 15 oz.	2½d.	" "
" 21 oz.	3½d.	" "
⅜ Hartley's Rolled Plate	1¾d.	" "
⅞ " " "	2d.	" "
¼ " " "	2¼d.	" "

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes or barrels	per gallon	0	1	8
" " " in drums	"	0	1	11
Boiled " " in pipes or barrels	"	0	1	11
" " " in drums	"	0	2	2
Turpentine, in barrels	"	0	3	8
" in drums	"	0	3	10
Genuine Ground English White Lead	per ton	19	0	0
Red Lead, Dry	"	19	0	0
Best Linseed Oil Putty	per cwt.	0	7	6
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.

	Per gallon. £	s.	d.
Fine Pale Oak Varnish	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Fine Extra Hard Church Oak	0	10	0
Superfine Hard-drying Oak, for seats of Churches	0	14	0
Fine Elastic Carriage	0	12	6
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	16	0
Finest Pale Durable Copal	0	18	0
Extra Pale French Oil	1	1	0
Eggshell Flatting Varnish	0	18	0
White Copal Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	6
Berlin Black	0	16	0
Knotting	0	10	0
French and Brush Polish	0	10	0

PUBLISHER'S NOTICES.

Nat. Tel. 6112 Gerrard. Telegrams, "The Builder, London."

CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROSPECTUSES OF PUBLIC COMPANIES, SALES BY TENDER, LEGAL ANNOUNCEMENTS, &c. &c.

Six lines or under 6s. 0d.
Each additional line 1s. 0d.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE AND GENERAL ADVERTISEMENTS.

Six lines or under 4s. 6d.
Each additional line 0s. 6d.

Terms for series of Trade advertisements, and for front page, and other special positions, on application to the Publisher.

SITUATIONS WANTED (Single-handed—Labour only).
FOUR lines or under 2s. 6d.
Each additional line 0s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps *must not* be sent, but all the sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE noon on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder" may have *Replies addressed to the Office*, Catherine street, Covent Garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES, { NINEPENCE EACH. By Post (carefully packed) 1s. }

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to J. MORGAN) should be addressed to the publisher of "THE BUILDER," Catherine-street, W.C.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office 19s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers) can ensure receiving "The Builder" by *Friday Morning's Post*.

CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., supplied by	Tenders to be delivered
Culverting Part of River Blackstaff, Victoria-street ..	Improvement Committee, Belfast...	City Surveyor, Belfast	Dec. 14
House, Carnmeen, Newry, Ireland	.....	W. J. Watson, Architect, Benvenne, Rostrevor, Ireland	do.
Drainage Work, Children's Home, Dartford Heath.....	Guardians of Union	Mr. Harston, A.M.Inst.C.E., 8, Hythe-street, Dartford	do.
830 ft. of 9-in. Pipe from Manor Gate to Main Sewer..	Dartford R.D.C.	do.	do.
Water Tower and Pumphouse, &c., to the Asylum.....	Ennis District Lunatic Asylum.....	F. O'Connor, Civil Engineer, Ennis Asylum, Ireland	do.
Forming and Paving Winifred-street	Warrington Borough Council.....	T. Longden, Borough Surveyor, Warrington.....	do.
2,000 tons of 5-in. Grit on Sandstone Cubes	do.	do.	do.
Stables, &c., to Aberaman	Cwmbach Industrial Co-op. Soc. ...	T. Roderick, Architect, Aberaman.....	do.
Brushes, &c.	Leicester Corporation	E. G. Mawbey, M.Inst.C.E., Borough Engineer, Leicester.....	do.
*Sanitary Pails	Barrow-upon-Soar, R.D.C.	H. Herrod, Barrow-upon-Soar.....	do.
Private Street Works	Stratford U.D.C.....	E. Worrall, Surveyor, Council Offices, Old Trafford, Manchester.....	do.
Alterations, Female Epileptic Block, Workhouse Infir.	Birmingham Guardians	W. H. Ward, Architect, Paradise-street, Birmingham.....	do.
Granite, &c.	Longton Corporation	J. W. Wardle, A.M.Inst.C.E., Borough Sur., Court House, Longton	do.
Sewage Disposal Works, &c., at Sewage Farm.....	Shildon and East Thickley U.D.C.	C. Heslop, Council Offices, Shildon.....	Dec. 15
2,000 loads of Jarrah or Karri Planks or Blocks	Newcastle-on-Tyne Corporation ...	City Engineer, Town Hall, Newcastle-on-Tyne.....	do.
Private Street Works	Rawtenstall Corporation.....	A. W. Lawson, A.M.Inst.C.E., Borough Surveyor, Rawtenstall	do.
Electrical Stores	Manchester Corporation	J. M. M'Elroy, Tramways Department, 55, Piccadilly, Manchester...	do.
Extensions to House, Silloth	W. Thomson.....	Johnstone Bros., Architects, 39, Lowther-street, Carlisle	do.
*Iron Fencing.....	Tottenham U.D.C.....	Council's Engineer, 712, High-road, Tottenham...	do.
*Making-up Roads	do.	do.	do.
Rebuilding Premises, Waterloo-place, Londonderry ...	R. Keys & Co.	T. Johnston, Architect, 11, East Wall, Londonderry	Dec. 16
Cast-Iron Mains, &c.....	Stockport Corporation.....	S. Mennier, Engineer, Stockport.....	do.
A Grinding Shop at Locomotive Works, Gateshead ...	N.E.R. Co.....	W. Bell, Architect to the Company, Central Station, Newcastle-on-T.	do.
Coach-house and Alterations to Stables	West Derby Union.....	C. H. Lancaster, Architect, Brougham-ter., W. Derby-rd., Liverpool	do.
Business Premises, Fore-street, Redruth.....	W. Snell.....	Sampson Hill, Architect, Green-lane, Redruth	Dec. 17
Museum and Art Gallery.....	Kingston-on-Thames Corporation...	A. Cox, Architect, 4, Adam-street, Adelphi, W.C.	do.
Furniture for New Hospital, Northampton	Hospital Committee	C. S. Risbee, Secretary, Northampton General Hospital	do.
Repairs, Dorchester Grammar School	.....	A. L. T, Tilley, Architect, Dorchester	do.
*Painting and Decorating Council Chamber, &c.	Metropolitan Borough of Islington	Borough Engineer, Town Hall, Upper-street, N.	Dec. 18
Street Gas Lamps	Great & Little Usworth Parish Cn.	J. R. Elliott, Clerk to Council, Fern House, New Washington.....	do.
Seven Houses, Sacriston, Durham	Armfield Plain Co-operative Soc....	G. T. Wilson, Architect, 22, Durham-road, Blackhill	do.
Villa Residence, Upper Greenroyd Estate, Haxifax.....	.....	A. G. Dazell, Architect, 15, Commercial-street, Halifax	Dec. 19
Motor Garage and Cycle Works, Bondgate	Alnwick Motor &c. Co.....	W. R. Hindmarsh, Architect and Surveyor, Alnwick.....	do.
Repairing, Painting, &c., the "Red Lion," Tredegar...	.....	T. Roderick, Architect, Glebeland, Merthyr	Dec. 20
Repairing, Painting, &c., the "Railway Inn," Pontlottyn	.....	do.	do.
Gartlock Asylum Extensions	Glasgow District Lunacy Board ...	Master of Works Office, Parish Chambers, 266, George-st., Glasgow	Dec. 21
Sixteen Artisans Dwellings.....	Mallow U.D.C.....	B. E. F. Sheehy, Architect, 57, George-street, Limerick	do.
Septic Tank & Bacterial Filter Beds, Moulton Pk. Fm.	St. Andrew's Hospital Committee...	B. Thompson, 67, Victoria-road, Northampton	do.
Stores for Six Months	Graigola Merthyr Co., Ltd., Swansea	The Company.....	do.
Fireclay Retorts, Firebricks, &c.	Gas Committee, Leeds Corporation	R. H. Townsley, Gas Offices, East Parade, Leeds	do.
English and Foreign Timber Required at Gasworks ..	do.	do.	do.
Extension of Cemetery, Harton.....	South Shields Corporation	S. E. Burgess, Borough Engineer, Chapter-row, South Shields	do.
Underground Conveniences, &c., Liscard	Wallasey U.D.C.....	W. H. Travers, District Engineer, Public Offices, Egremont, Cheshire	Dec. 22
*New School, Napier-road.....	Gillingham (Kent) Education Com.	Secretary, 8, Waterloo-road, New Brompton, Kent	do.
*Enlargement of Post Office, Middlesbrough	H.M. Office of Works.....	H.M. Office of Works, Storey's Gate, Westminster, S.W.....	Dec. 23
Mission Hall, Sanders-avenue, Kendal	.....	J. F. Curwen, F.R.I.B.A., 26, Highgate, Kendal	do.
Three Houses and Two Shops, London-road, Worcester	.....	H. P. Smith, 5, Foregate-st., & F. Hall, Clifton-on-Teme, Worcester	do.
15-ton Steam Road Roller and Scarifier	Glasgow Corporation.....	T. Nisbet, Master of Works, City Chambers Glasgow	do.
*Making-up Cloncurry-street	Borough of Fulham	Borough Surveyor, Town Hall, Fulham, S.W.	do.
Private Street Works	Erdington U.D.C.	H. H Humphries, Eng. & Surv., Public Hall, Erdington, Birm'ham.	Dec. 24
Freewiring	Pontypridd U.D.C.....	R. P. Wilson, Consulting Engineer, 66, Victoria-street, Westminster	do.
Sewage Disposal Wks. (Bacterial Prin.) West Shield-row	Stanley U.D.C.....	J. Routledge, Surveyor to Council, Front street, Stanley	Dec. 26
Iron Foundry Work for Sewage Works	do.	do.	do.
Alterations, 76, Sankey-street	Education Committee, Warrington	T. Longden, Borough Surveyor, Warrington	Dec. 28
Assembly Hall and Classrooms, Fenton-st., Lancaster	Society of Friends	S. E. Barrow, Architect, Liverpool Bank Chambers, Lancaster	do.
*Cottage Homes, New Malden, Surrey	Guardians Kingston Union...	W. H. Hope, Architect, Seymour-road, Hampton Wick.....	do.
Steel Superstr., for Coal Hoist Viaducts, Grangemouth	Caledonian Ry. Co.	J. Wolfe Barry, K.C.B., 21, Delahay-street, Westminster, S.W.	do.
Superstructure of Government Offices, Cardiff.....	Commissioners of H.M. Works	A. Gilbertson, Architect, 6, Stanley-street, Liverpool.....	Dec. 29
Roadmaking Machinery	Tipperary C. C. (N. Riding)	Company's Offices, 9, Great Castle-street, W.	Dec. 30
*Sewerage and Surface Water Drainage Works.....	Walmer U.D.C.	Beesley, Son, & Nichols, 11, Victoria-street, S.W.	Jan. 1, '04
*Sewage Disposal Works.....	Cheshunt U.D.C.....	Clerk's Office, Manor House, Cheshunt.....	do.
*Filtering Tank and Sludge Beds, Enfield	Cheshunt U.D.C,.....	Council's Clerk, U.D.C. Offices, Manor House, Chesthunt, Herts	do.
*Coastguard Station at Herne Bay.....	The Admiralty	Works Department, Admiralty, 21, Northumberland-avenue, W.C.	do.
Public Library and Offices, Hounslow.....	Heston & Isleworth U.D.C.	Nowell Parr & A. E. Kates, Architects, Brunswick House, Brentford	Jan. 4
Swimming Bath, Hounslow.....	.....	do.	do.
Main Drainage, Whitwick	Coalville U.D.C.....	J. B. Everard, M.Inst.C.E., 6, Millstone-lane, Leicester	do.
*Public Offices, Baths and Library	Heston & Isleworth U.D.C.....	Nowell Parr & Kates, Architects, Brunswick House, Brentford, W.	do.
Bridge Widening, Scotswood-on-Tyne.....	Newburn U.D.C.....	T. Gregory, Surveyor, Council Offices, Newburn	do.
*Taking down Church &Bdg. New Church, Whitehaven	.....	J. S. Moffat, Architect, 53, Church-street, Whitehaven	Jan.
*Lunatic Wards at Whipp's Cross-road, Leytonstone ...	West Ham Union	Clerk's Office, Union Workhouse, Leytonstone, N.E.	Jan.
Installation of Inclined Retorts, Gaythorn Station.....	Gas Committee, Manchester Corp.	J. G. Newbigging, Civil Engineer, Rochdale-rd. Gas Stn, Manchester	Jan.
*Annual Contracts	Borough of Camberwell	Borough Engineer, Town Hall, Camberwell, S.E..	Jan. 19
Electric Power Plant for Lighting, Pumping, &c.	Enniscorthy Dist. Lunatic Asylum	H. T. Harris, Consulting Engineer, 30, Parliament-street, Dublin...	Jan. 20
Sinking two Pits, Brynlliw, Groves End, Pontardulais	.....	Registrar, County Court, Cardiff.....	No date.
Catholic Church and Presbytery, Barmouth	.....	County Surveyor, Court House, Nenagh, Ireland.....	do.
*Erection of Houses, New Barnet	Ldn. & Dist. Land & Bdg. Co., Ltd.	T. Williams & Sons, Colliery Proprietors, Llangennech	do.
*New Ward and other Works	Kent and Canterbury Hospital	W. J. Jennings, Architect, 4, St. Margaret's-street, Canterbury	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
Sanitary Inspector.....	Lewisham Borough Council	150*l.*	Dec. 14
Head of Building Trades Department	Northern Polytecnic Institute	250*l.*	do.
Assistant in Building Trades Department	do.	100*l.*	do.
Assistant Lecturer, &c. (Chemical Department)	do.	90*l.*.....	do.
Second Assistant, Engineer's & Surveyor's Departmen	Twickenham U.D.C.	80*l.*	Dec. 15
Architectural Assistant.....	Straits Settlements Government ...	360*l.* &c.	Dec. 21
Assistant Examiners in Patent Office	Civil Service Commissioners	Not stated	Dec. 22
Borough Surveyor	Battersea Borough Council.....	500*l.*	Dec. 31
Assistant Civil Engineer, Admiralty	Civil Service Commissioners	Not stated	Jan. 7, '04.
Civil Engineering Draughtsman	The Admiralty	Not stated	No date.

☞ *Those marked with an asterisk (*) are advertised in this Number.* *Competition*, iv. *Contracts*, iv. vi. viii. & x. *Public Appointments*, xviii.

TO CORRESPONDENTS.

K. F. C. (Amount should have been stated).—G. W. L. (Below our limit).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BISHOP AUCKLAND.—For the execution of sewerage works, Leasingthorne, for the Rural District Council. Mr. C. Johnston, Surveyor, Crofton House, Bishop Auckland:—

G. H. Bell	£2,629 0 0	G. Hetherington	£2,238 13 9
P. Frater, Howden-le-Wear,		R.S.O., Durham*,	£2,196 10.

BISHOP'S STORTFORD.—For repairing engines at sewage pumping station and waterworks, for the Urban District Council. Mr. R. S. Scott, A.M.Inst.C.E.:—

Thos. Walker, Oldbury Works, Tewkesbury* £118 5

BRENTFORD.—For the supply of 250 cubic yards of blue Guernsey granite, for the Urban District Council. Mr. Nowell Parr, Surveyor, Clifden-house, Boston-road, Brentford:—

	per cubic yard. s. d.		per cubic yard. s. d.
A. & E. Manuelle	15 9	Tray Bros.	14 6
Griffiths Bros.	15 7	Le Maitre, 51, Grosvenor-road, Westminster*	14 5
Sommerfeld	15 3		
Mowlem & Co.	14 10		

BRISTOL.—For the erection of three shops and dwelling-houses, Gloucester-road, Bishopston. Messrs. Holbrow & Oaten, architects, 9, Clare-street, Bristol. Quantities by architects:—

Eastabrook & Son	£2,350	R. Wilkins & Son	£2,189
R. F. Ridd	2 330	E. Walters & Son	2,170
Jones & Hill	2,325	J. Hatherley	2,167
M. Durnford	2,299	J. Chapman	2,094
E. Preece	2,250	F. Brown	2,074
E. Love	2,240	J. E. B. James*	1,795

* Reduced to £1,690 and accepted.

BURSLEM.—For erecting a generating station at gasworks, Longport, for the Electric Lighting Committee. Mr. Ashton Bremner, Borough Electrical Engineer, Burslem. Quantities by Engineer:—

Thos. Goodwin	£2,235	W. Cooke	£2,160
Bennett Bros.	2,168	W. Grant & Sons*	2,100

[Engineer's Estimate £2,263]

EASTBOURNE.—For erecting public baths, Old Town, for the Corporation. Mr. W. Chapman Field, architect, Town Hall, Eastbourne:—

F. G. Minter	£4,210	Cornwell & Son	£3,660
A. J. White	4,036	Dennis & Co., Eastbourne	3,548
J. Martin	3,759	Mark Hookham‡	2,934
Miller & Selmes	3,720		

‡ Withdrawn.

EVENWOOD.—For erecting a branch store for Bishop Auckland Industrial Co-operative Society. Mr. F. H. Livesay, architect, Bishop Auckland:—

Masonry.—J. Teward, Burnt Houses, Cockfield*	£626 0 9
Joinery and Carpentery.—Huddlestone, Co-operative Stores, Shildon*	362 4 11
Plastering.—Kirby, Durham-street, Auckland*	60 18 0
Slating.—J. & R. Muscall, Peel-street, Auckland*	83 17 0
Plumbing—Edward Thompson, Newgate-street, Auckland*	86 7 0
Painting and Glazing.—J. T. Barker, South-road, Auckland*	54 5 10
	£1,273 13 6
Walton Bros., Crook‡	1,743 10 0
Ward Bros., Coundon‡	1,533 10 6
Todd & Willey, Mainsforth-road, Ferryhill‡	1,518 1 2
G. H. Bell, Bishop Auckland§	1,380 18 0
Wilson & Sons, Barnard Castle‖	928 6 1

‡ Sole tender. § Less carpentry and joinery. ‖ Less plumbing.

ELGIN.—For the erection of a villa in Forteath-avenue, Elgin. Mr. R. B. Pratt, architect, Elgin:—

Masonry.—John McPherson, Bishopmill, Elgin*
Carpentry.—J. & A. Robb, Rothes*
Plumbing.—J. Gordon & Son, Elgin*
Slating.—Thomas & Fraser, Elgin*
Plastering.—Jas. Brodie, Elgin*
Painting.—Wm. Fordyce, Elgin*
Ironwork.—Youngson Bros., Elgin*
£750

GRIMSBY.—For heating extensions to Police Department at Town Hall. Mr. H. Gilbert Whyatt, Borough Engineer:—

	Specified Scheme £ s. d.		Alternative Scheme submitted by Contractor £ s. d.
King, Ltd.	322 16 6	...	175 0 0
J. Stott & Co.	—	...	305 16 0
J. Jeffries	302 10 0	...	218 0 0
Wright & Son	231 16 0	...	—
W. Houghton & Co.	—	...	275 0 0
Tomlinson & Milan	263 4 0	...	263 4 0
A. Cook	250 9 6	...	227 14 2
Brearley, Horrox & Co.	237 12 0	...	—
T. Russell	235 2 8	...	235 2 8
J. Jackson & Co.	233 4 0	...	—
Duke, Ltd.	—	...	218 7 0
A. J. Kalloway	216 14 0	...	201 6 0
D. J. Dolby	214 13 0	...	242 12 6
A. Macintosh & Sons	211 15 0	...	211 15 0
Unity Wood and Iron Co.	202 8 0	...	198 0 0
W. C. Sharpe	195 5 0	...	—
Parker, Ltd.	—	...	195 0 0
Lancashire Heating Co.	—	...	160 0 0
C. Seward & Co., Britannia Iron Works, Preston*	146 19 0	...	136 19 0

HALIFAX.—For building extensions to works, for the Campbell Gas Engine Co., Ltd. Messrs. Jackson & Fox, architects, 7, Rawson-street, Halifax:—

Masonry:—J. Turner & Son, Halifax*	£1,529 0
Carpentry and Joinery.—J. Halliday, Miall-street, Halifax*	390 0
Iron and Steel.—A. Pulman & Son, Halifax*	1,290 0
Patent Glaziery.—Heywood & Co., Huddersfield*	207 4
Plumbing and Glazing.—Bolton Bros., Halifax*	241 0
Slating and Plastering.—Rushworth & Frith, Halifax*	300 0
Painting.—S. Ackroyd, Queen's-road, Halifax	72 2

HARROGATE.—For erecting four houses, Skipton-road, for Mr. C. Barraclough. Mr. Thos. Godfrey, architect, 83, Skipton-road, Harrogate. Quantities by architect:—

Thos. Godfrey, Harrogate* £1,700.

HULL.—For laying sewers at North Ferriby for Sculcoates Rural District Council. Messrs. Wellsted & Easton, engineers, Prince's Dock-chambers, Hull:—

E. Hawley	£1,102 15 6
J. Brunton	956 0 0
H. Medforth	944 0 0
B. Robinson	853 15 0
R. Fisher, 134, Hawthorne-avenue, Hull*	805 8 10

INGATESTONE (Essex).—For re-building Avenue House, for Mr. M. Quinn, from designs prepared by Messrs. Clare & Ross, 1, West-street, Finsbury-circus, E.C., and Westcliff-on-Sea:—

F. Johnson, Chelmsford* £1,200.

JARROW.—For alterations and additions to Dunn-street School for Hedworth, Monckton & Jarrow Urban District School Board. Mr. H. M. Adam, clerk of works:—

W. Cowper	£768 5 8	Wm. Kennedy	£693 0 6
J. A. M. Henderson	704 0 0	Glen & Moffett, Napier-street, Jarrow*	577 7 5
J. Barrow	701 0 0		

KILMARNOCK (N.B.).—For the construction of generating station and tram-car shed for the Corporation. Mr. Robert Blackwood, Borough Surveyor, Market-bridge, Kilmarnock:—

Digger Work.—W. Lawson, Kilmarnock*	£4,148 3 8
Chimney Stack.—W. Calderwood, Kilmarnock*	1,704 15 9
Foundry and Smith Work.—Clerk & Son, Ltd., Glasgow*	2,181 9 3
Bricklaying and Masonry.—Muir & Co., Kilmarnock*	4,461 14 6
Carpentry Joinery and Glazing.—Rome & Son, Kilmarnock*	2,607 0 0
Slating.—R. Stevenson, Kilmarnock*	169 15 4
Plumbing.—R. Garven, Kilmarnock*	938 10 8
Plastering.—Rome & Son, Kilmarnock*	121 4 2
Painting.—W. Orr Kilmarnock*	122 10 1
Boilers.—Yates & Thomason, Blackburn*	1,765 0 0
Engines and Dynamos.—Dick, Kerr & Co., London	3,855 0 0
Overhead Crane.—Carrick & Retchie, Edinburgh*	268 0 0
Storage Battery.—Tudor Accumulator Co., London*	1,201 0 0
Switchboard and Boosters.—Cox Walkers, Darlington*	1,989 0 0

LETTERKENNY (Ireland).—For enclosing recreation ground, &c., for the Urban District Council. Mr. Patrick Dawson. C.E., Town Surveyor:—

James Orr Johnston, Castlehaul, Letterkenny*, £265.

LLANDRINDOD WELLS.—For four houses in Craig road, for Mr. E. Bufton. Mr. E. Peters Morris, architect, Llandrindod Wells:—

George Bullock	£2,497	R. Davies, Llandrindod Wells*	£2,300
D. Meredith	2,418	Lloyd & Lloyd	2,260

LONDON.—For the erection of Wenlake-buildings, Roby-street, St. Luke, which are to be erected in pursuance of the London (Garden-row, Roby-street, Baltic-street and Honduras-street, St. Luke) Improvement Scheme, 1899, for the London County Council:—

A. Porter	£21 609	F. & H. F. Higgs	£20,800
J. & M. Patrick	21,300	Leslie & Co.	19,660
H. L. Holloway	21,090	Kirk & Randall	19,474
Spencer, Santo & Co.	21,000	Holloway Bros., Ltd.	19,242
Scimpson & Co.	20,880	Haslemere Builders, Ltd.*	18,861
H. Lovatt	20,870		

LONDON.—For the execution of repairs and painting work required on the roofs of the main boiler-house, stores, and workshops at the Crossness outfall, for the London County Council:—

K. Collingwood	£966 6 0
Lewis Kazak	929 19 9
Vigor & Co.	850 0 0
J. Scott Fenn	799 16 0
Gray & Co.	722 2 2
Ellingham & Sons	719 12 10
Woollaston & Co.	715 18 0
Woollaston Bros.	688 0 0
Enness Bros.	614 0 0
Proctor & Son*	610 12 4
George Martin	537 0 0

LONDON.—For glazed roofing and drainage works for St. George's-in-the-East Guardians:—

G. E. Weston, Wellclose Square, E. £104 17 6

MARGATE.—For construction of a concrete reservoir at Flete, for Waterworks Committee. Mr. Albert Latham, A.M.Inst.C.E., 15, Cecil-square, Margate. Quantities by Messrs. Hovenden and Barber, 30, Bishopsgate-street Without, E.C.:—

Anderson Brs.	£9 565 2 9	A. Osenton	£3,034 3 7
H. Shardlow	8,592 0 0	A. Fasey & Son	5,984 0 0
H. T. Binns	7,030 18 8	H. Ashley	5,849 8 6
W. W. Martin	6,910 0 0	G. Browning	5,794 0 0
T. Pedrette	7,681 3 7	R. Roberts	5,793 8 0
Denne & Co.	6,807 0 0	G. Bell	5,689 0 0
Castle & Co.	6,585 6 7	J. W. Dean	5,530 13 3
W. I. Adcock	6,412 12 6	A. E. Nunn	5,487 8 9
F. R. Miskin	6,274 0 4	Denne & Sons, Walmer*	5,479 0 0
Paramor & Sons	6,235 19 6		

NEWCASTLE-UNDER-LYME.—For laying down about 650 yards of 9 in. sewer, &c., for the Rural District Council. Mr. A. E. Jones, C.E., Brunswick-street, Newcastle-on-Lyme:—

Morley & Sons	£395	W. Williams	£318
G. K. Downing	390	Smith & Taylor, Basford*	305
F. Barke	389		
S. Wilton	328		

NEW HUNSTANTON.—For the construction of a sewer, for the Urban District Council. Mr. James C. Walker, Surveyor to the Urban District Council:—

F. Southgate	£1,163	W. A. Leach, Hunstanton*	£775
John Nelson & Co.	1,090		
Reuben Shanks	1,025		

NORTHALLERTON.—For the construction of a Sewer in Back-street, Northallerton, and taking out existing sewer, for Urban District Council. Mr. Daniel Hinchcliffe, the Council's Surveyor.

D. Oakley, Northallerton* £189 10

PRESTON (Lancs.).—For the execution of paving works, Salisbury-street, for the Corporation:—

Calverley Street.
Chadwick Bros., Blackburn* £372 3 9
Pechell Street.
Chadwick Bros., ,, * £588 3 5
Salisbury Street.
John Moxham & Sons, Preston* £418 14 0
English Martyr's Place.
John Moxham & Sons, Preston* £379 14 4

SHEFFIELD.—For sale-shops and artizans' dwellings, Infirmary-road and Lock-street, for Sheffield City Council. Messrs. C. & C. M. Hadfield, architects, 19, St. James's Street, Sheffield:—

John Webster	£4,483 0 0
Dawson, Jones & Co.	4,462 12 6
James Fidler	4,450 0 0
W. & A Forsdike	4,405 0 0
Matthew Grantham	4,400 0 0
Ash, Son & Biggin	4,388 0 0
Eshelby & Son	4,300 0 0
Arthur Bradbury	4,078 0 0
Vasey & Son	3,851 9 0
John Robertson	3,840 2 6
Boot & Son	3,770 0 0
O'Neill & Son*	3,709 0 0

SONNING.—For the erection of two houses, Sonning, for Mr. G. St. Croix Rose. Mr. Arthur Vernon, architect, 29, Cockspur-street, London, S.W., and High Wycombe, Bucks.:—

Y. J. Lovell	£1,592	Silver & Son	£1,494
G. H. Gibson	1,525	H. Flint, Wycombe*	1,485
G. Robinson	1,498		

SOUTHEND-ON-SEA (Essex).—For the erection of a Meeting Hall in London Road, from designs prepared by Messrs. Clare & Ross, 1, West-street, Finsbury-circus, and Westcliffe-on-Sea:—

R. Henderson	£753	Cubitt & Gotts	£676
G. Mathieson	708	A. Whur, Westcliff-on-Sea*	630

SOUTH SHIELDS.—For paving works, &c., Whitburn, for the Rural District Council. Mr J. H. Morton, architect, 50, King Street, South Shields:—

George Wells	£4,692	G. Simpson	£3,938
J. White	4 576	W. D. Allison, Whitburn*	3,660
Thornton & Co.	4,556		

[*See also next page.*

TIPTON (Staffs).—For alterations to the out-offices, &c., Burnt Tree Council School, for the Education Committee. Mr. W. H. Jukes, Surveyor to the Council :—

Thompson & Co.	£285 0 0	G. Holloway	£265 0 0
J. Hunt	284 10 0	Ashphates United, Birmingham*	248 9 4
M. Round	280 0 0		

[Surveyor's Estimate..... £297 11 6]

WALTHAM ABBEY.—For channelling Sun-street and kerbing and paving Farm-hill, for Waltham Holy Cross Urban District Council. Mr. W. T. Streather, Surveyor, High Bridge-street, Waltham Abbey :—

Griffiths & Co., Ltd.	£224 19 9
Joseph Jackson	196 8 6
E. J. Hanchet	179 0 0
S. Kitteringham	178 13 3
Grounds & Newton, South Tottenham*	162 4 0

WEST PENWITH (Cornwall.)—For widening, &c., certain roads for West Penwith District Council. Mr. Thomas Curnow, District Surveyor, Goldsithney Marazion. Quantities by Surveyor :—

St. Erth Roads.

Nicholls & Stevens	£100	John Hocking, Gwinear, Hayle*	£75

Lelant Roads.

John Hocking	£310
Nicholls & Stevens	290
Philip Hurrell, Lelant, R.S.O., Cornwall*	144

WOBURN-SANDS.—For the erection of a pair of cottages, Station-road, for Mr. C. Dudley. Mr. W. B. Stonebridge, architect, Woburn and Woburn-Sands :—

Foster	£685	H. Gregory	£550
W. T. Sharpe	589	C. Sinfield, Aspley*	534

LONDON SCHOOL BOARD TENDERS.

AT the last meeting of the London School Board the Works Committee submitted the following lists of tenders :—

BREWHOUSE-LANE SCHOOL (Wapping). — For building new boiler-room, flue, &c.

Rockhill Bros.	£438 5	J. T. Robey	£225
Belcher & Co., Ltd.	249 15	A. J. Sheffield*	218
G. Barker	225 0		

HINDLE-STREET SCHOOL (Shacklewell). — For repairs, &c., to schoolkeeper's house.—

Williams & Son	£349	Haydon & Sons	£279
W. Martin	337	Barrett & Power	275
Woollaston Bros.	315	Runham Brown*	265
J. F. Holliday	310		

LAMB-LANE SPECIAL SCHOOL (Hackney). — Alterations :—The old school in Lamb-lane, Hackney, which was formerly used as a day school, is now being used for a school for special instruction. In order that the building shall comply with the requirements of the new rules for building, it will be necessary to carry out alterations to the existing premises, consisting of separating the playgrounds, providing a bath, and girls' lavatory, &c. As it is desirable that this work shall be carried out at once, the Committee, as a matter of emergency, agreed to place it in the hands of Messrs. F. and F. J. Wood, the work to be measured up on completion, and the actual cost calculated on the schedule of prices for repairs. They propose at the same time to divide a portion of the girls' cloakroom so as to form a stock room for the use of the Correspondent, the total estimated cost of the work being £200.

WHITFIELD-STREET SCHOOL (Tottenham Court-road).—Work of Reversing Stepped Flooring, &c., to be executed by local contractor :—

W. Hornett	£333 0	Thompson & Beveridge	£125 0
T. Cruwys	330 0	Marchant & Hirst	121 0
General Builders, Ltd.	159 0	J. R. Sims	117 10
Barrett & Power			£109.

As the amount of the lowest tender is in excess of the Architect's estimate, the Committee propose that, in this case, the work should be carried out by the Local Contractor for Repairs, and the cost calculated on his Contract Schedule of Prices for Repairs.

WOOD-STREET SCHOOL (Woolwich).—For additional heating in girls' department :—

Stevens & Sons	£170 0	Paragon Heating Co.	£149 15 0
Brightside Foundry and Engineering Co., Ltd.	165 0	Palowkar & Sons	148 0 0
W. G. Cannon & Sons	163 0	J. Defries & Sons, Ltd.*	135 17 6

For structural alterations, &c., at various Schools to be carried out during Christmas holidays :—

FINSBURY (Station-road School):—

Grover & Son	£467 0 0	McCormick & Sons	£369 0 0
Dearing & Son	425 0 0	Stevens Bros.	363 0 0
J. Stones	402 15 6	Barrett & Power	326 0 0
H. Bouneau	380 0 0	A Porter*	290 0 0
Williams & Son	379 0 0		

GREENWICH (Randall-place School):—

H. Line +20% on Schedule		G. Kemp	£436
London School Furniture Co.	£674	H. Groves	427
Rice & Son	525	Leney & Son	398
T. D. Leng	449	Proctor & Son*	383

TOWER HAMLETS (Mortleith-road School):—

H. Bouneau	£392 10	A. J. Sheffield	£331
G. Barker	365 0	A. W. Derby*	215
A. E. Symes	346 0		

WEST LAMBETH (Garret-lane School):—

J. & M. Patrick	£221	R A. Jewell	£152 0
R. S. Ronald	198	E. B. Tucker	149 13
W. Hammond	165	Galbraith Bros.	129 0
E. Triggs	155	Garrett & Son*	120 0
Lathey Bros.	153		

B. NOWELL & CO.
STONE MERCHANTS & CONTRACTORS.
Chief Office.—*Warwick Road, KENSINGTON.*
Norway, Guernsey, and Leicestershire Granite, Kerb, Pitching, and Yorkshire Stone.
ESTIMATES GIVEN FOR EVERY DESCRIPTION OF ROAD MAKING.

W. H. Lascelles & Co.,
121, BUNHILL ROW, LONDON, E.C.
Telephone No. 1365, London Wall.
HIGH-CLASS JOINERY,
LASCELLES' CONCRETE.
Architects' Designs are carried out with the greatest care.
CONSERVATORIES,
GREENHOUSES,
WOODEN BUILDINGS,
Bank, Office, & Shop Fittings.
CHURCH BENCHES & PULPITS.
ESTIMATES GIVEN ON APPLICATION.

THE BATH STONE FIRMS, Ltd.
BATH.
FOR ALL THE PROVED KINDS OF
BATH STONE.
FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

HAM HILL STONE.
DOULTING STONE.
The Ham Hill and Doulting Stone Co.
(incorporating the Ham Hill Stone Co. and C. Trask & Son, The Doulting Stone Co.).
Chief Office :—Norton, Stoke-under-Ham, Somerset.
London Agent :—Mr. E. A. Williams, 16, Craven-street, Strand.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co.

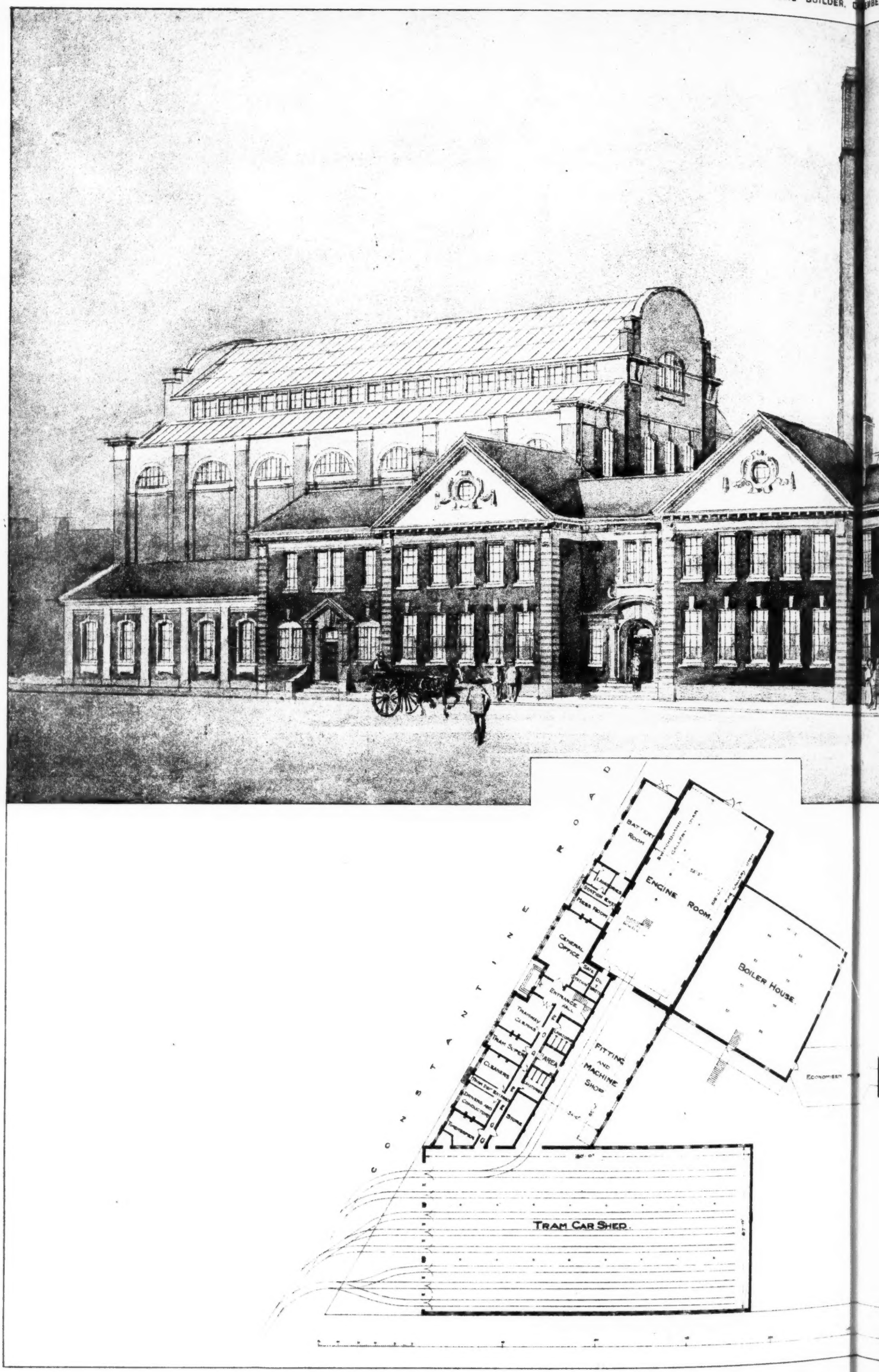
SPRAGUE & CO., Ltd.,
PHOTOLITHOGRAPHERS,
4 and 5, East Harding-street,
Fetter-lane, E.C.

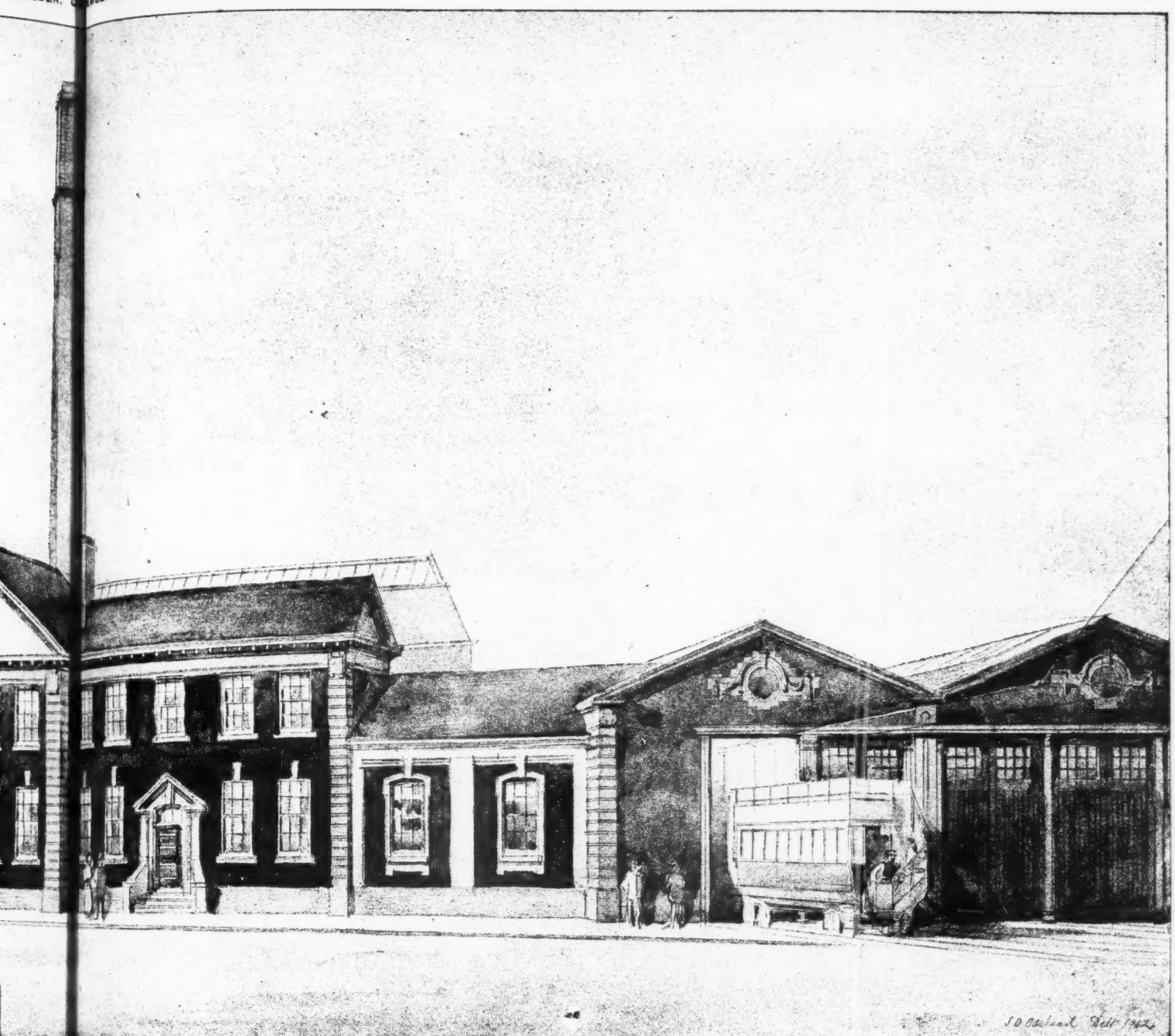
QUANTITIES, &c., LITHOGRAPHED accurately and with despatch. [Telephone No. 456 Westminster.
METCHIM & SON { 8, PRINCES STREET, S.W. and 32, CLEMENT'S LANE, E.C.
"QUANTITY SURVEYORS' DIARY AND TABLES," For 1904, price 6d. post 7d. In leather 1/- Post 1/1.

BEST BATH STONE.
Original Hartham Park Box Ground & Corsham.
EVERY BLOCK BRANDED WITH OUR REGISTERED TRADE MARK.
MARSH, SON, & GIBBS, Ltd.
Chief Offices: Great Western Chambers. Bath.
London Offices: 18, Great Western Road, Paddington.
WORKED STONE A SPECIALITY.

PILKINGTON & CO
(ESTABLISHED 1838.)
MONUMENT CHAMBERS,
KING WILLIAM STREET, LONDON, E.C.
Telephone No., 6319 Avenue
Registered Trade Mark,
Poloncean Asphalte.
PATENT ASPHALTE and FELT ROOFING.
ACID-RESISTING ASPHALTE.
WHITE SILICA PAVING.
PYRIMONT SEYSSEL ASPHALTE.

THE CURE FOR SMOKY CHIMNEYS
EWART'S "EMPRESS" SMOKE CURE
DURING AN EXPERIENCE OF 70 YEARS WE HAVE FOUND NO SMOKE CURE SO SUCCESSFUL AS THE "EMPRESS"
PREVENTS DOWN-BLOW
INCREASES UP-DRAUGHT
EWART & SON LIMITED
346-350 EUSTON ROAD LONDON N.W.
WRITE FOR CATALOGUE "SECTION 55" POST FREE


CONSTANTINE ROAD
BATTERY ROOM
ENGINE ROOM
BOILER HOUSE
GENERAL OFFICE
ENTRANCE HALL
TRAMWAY CLERKS
TRAM SUPTS
CLEANERS
AREA
FITTING AND MACHINE SHOP
TRAM CAR SHED
ECONOMISER

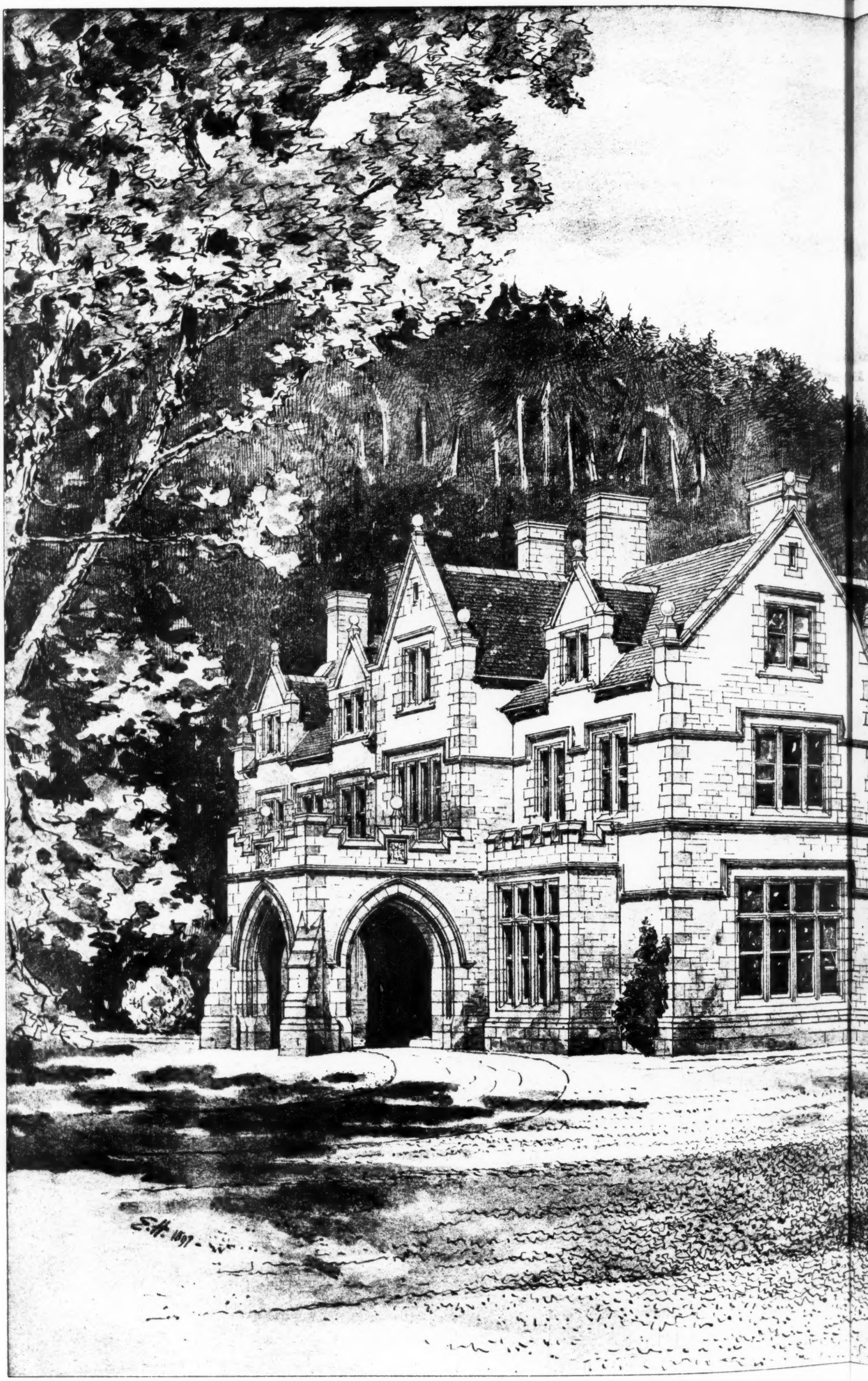


ELECTRIC GENERATING STATION AND OFFICES FOR THE CORPORATION OF IPSWICH.

MESSRS C. STANLEY PEACH AND C. H REILLY, JOINT ARCHITECTS.

MESSRS. KENNEDY & JENKIN, ENGINEERS.

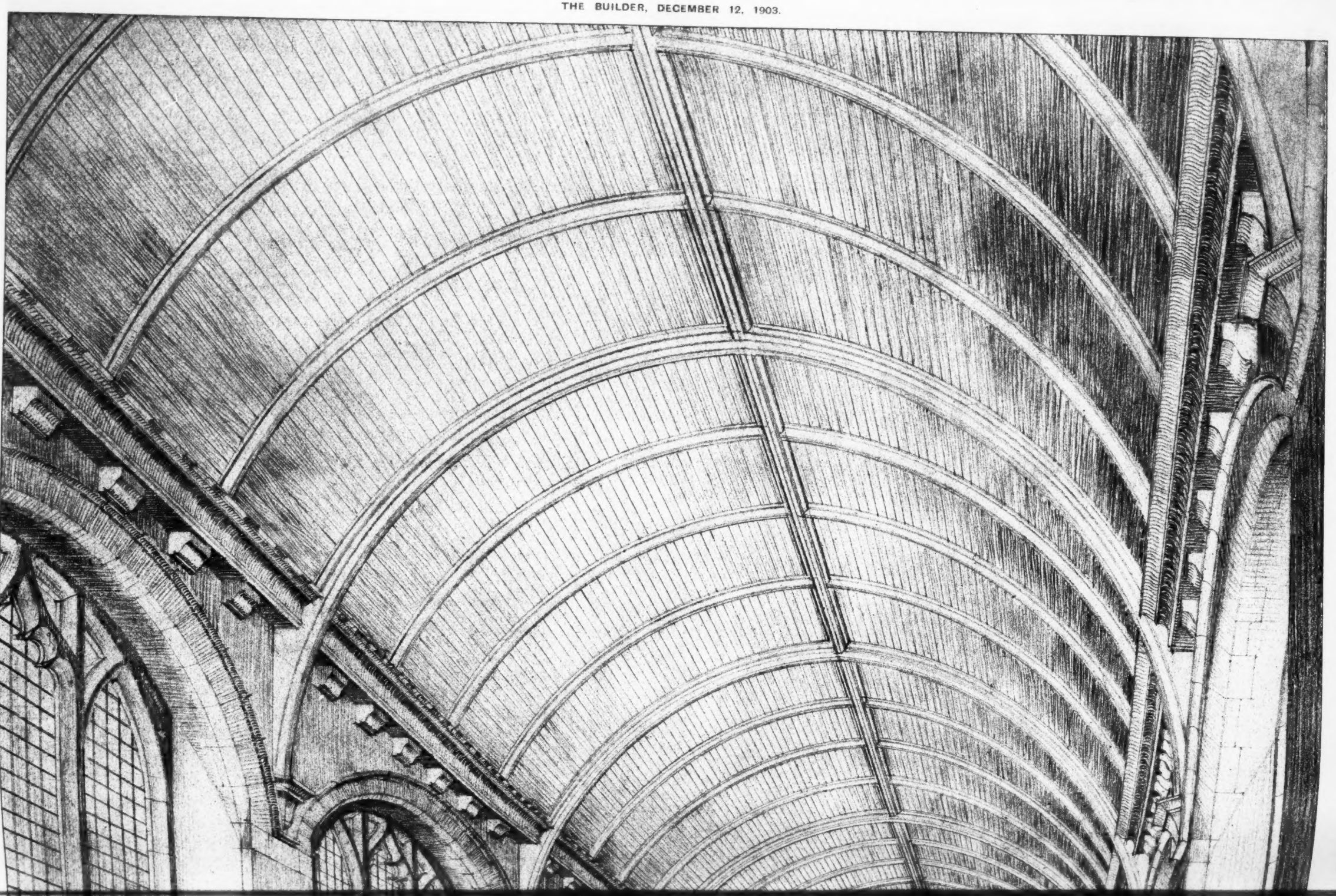
INK PHOTO SPRAGUE & C° LTD 4 & 5 EAST HARDING STREET FETTER LANE E.C.

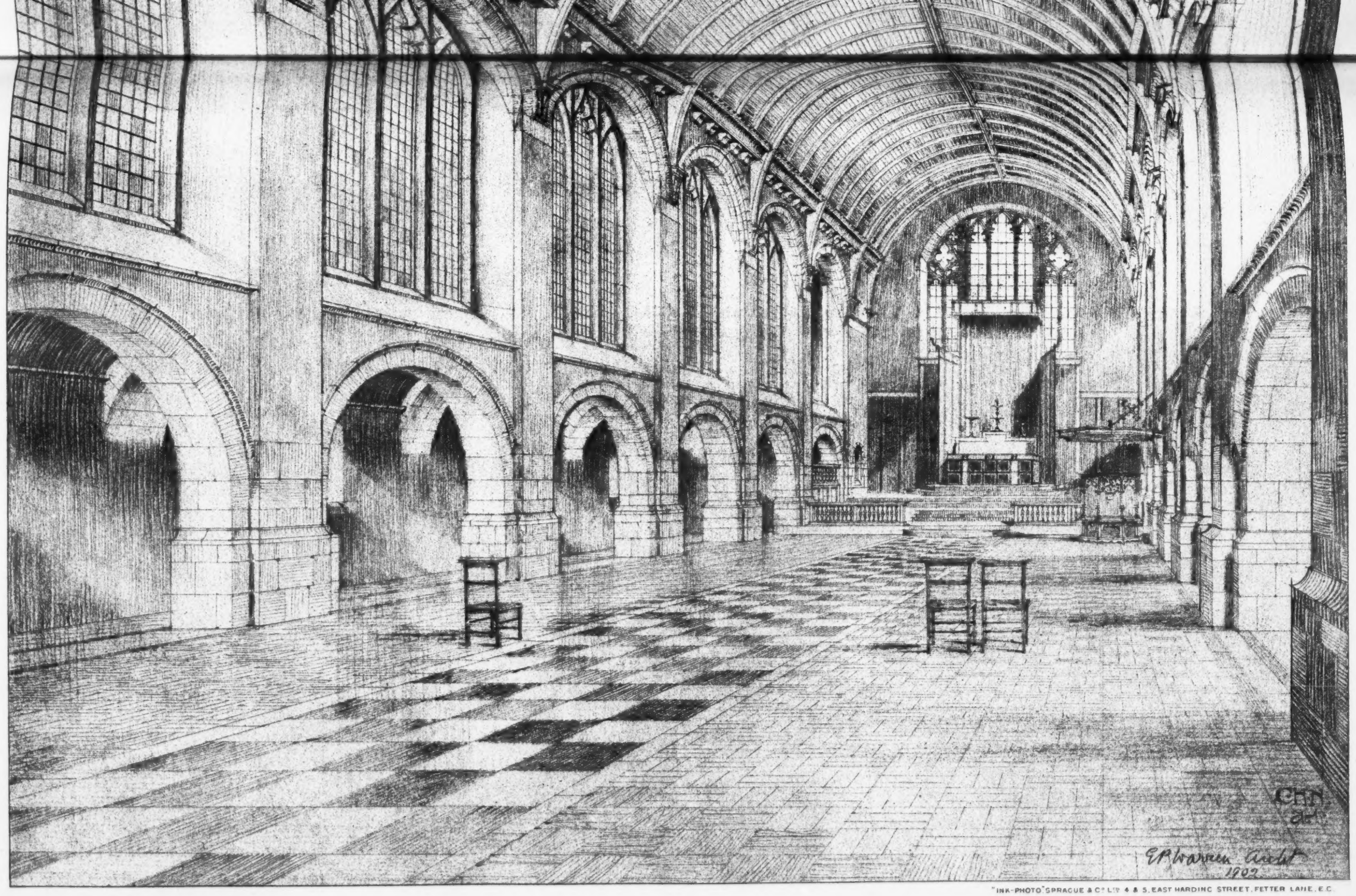


"BUCKLAND," BRECKNOCKSHIRE.—THE

"INK-PHOTO" SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

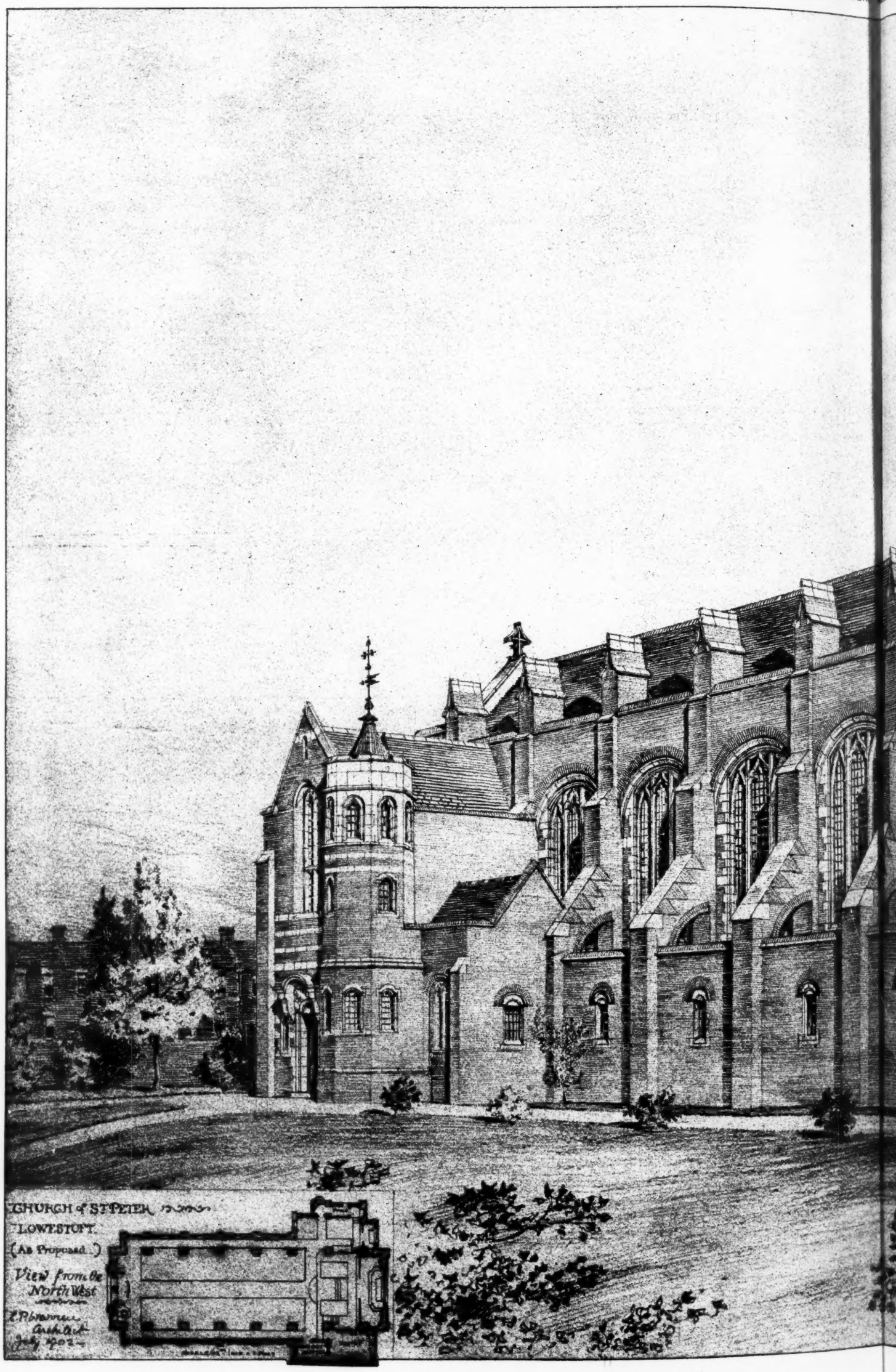
SHIRE.—The late Mr. S. W. Williams, Architect.

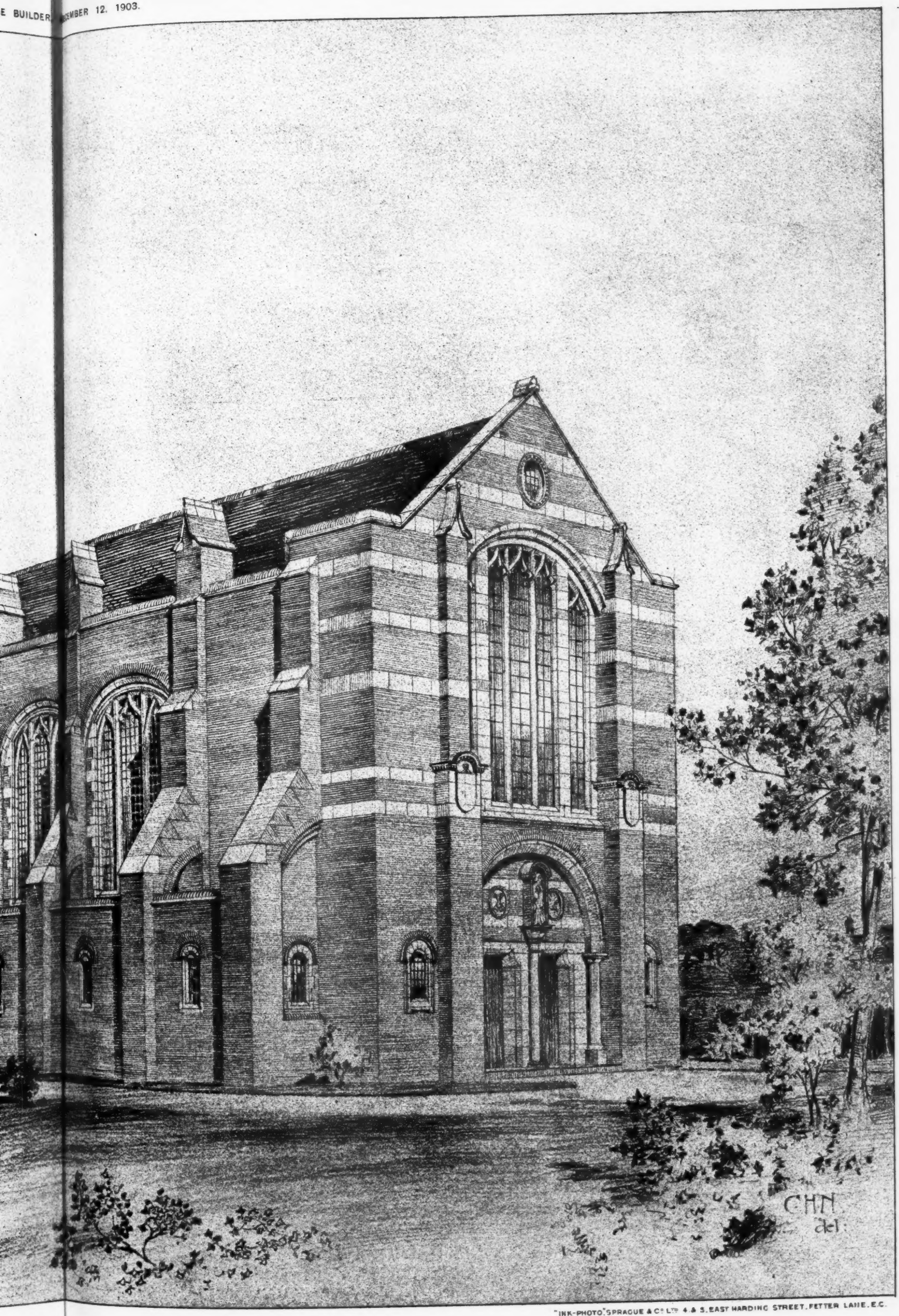




"INK-PHOTO" SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

ST. PETER'S CHURCH, LOWESTOFT: INTERIOR.—Mr. E. P. Warren, Architect.


CHURCH of ST PETER
LOWESTOFT.
(As Proposed.)
View from the North West
F. Pbrannen
Architect
July 1902.



"INK-PHOTO" SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.